BANGALORE WATER SUPPLY AND SEWERAGE BOARD

5th Floor, Cauvery Bhavan,
K.G. Road, Bangalore 560009

Tender for the Various Improvement Works taken up under Jal Hi Amrut scheme at 02 MLD Ulsoor STP coming under EE(WWM-STP)K&T Division

(Through Karnataka Procurement Portal only)

https://www.kppp.karnataka.gov.in

Office of the Chief Engineer (Waste Water Management-East)
BANGALORE WATER SUPPLY & SEWERAGE BOARD
5th Floor, Cauvery Bhavan,
K.G. Road, Bangalore 560009
Telephone – 080-22945106

TENDER REFERENCE :	:	No.: BWSSB/CE(WWM-E)/DCE(WWM-E&W)/TA-1/421/ 2025-26 Dated: 21-06 -2025
NAME OF THE WORK	:	**Various Improvement Works taken up under Jal Hi Amrut scheme at 02 MLD Ulsoor STP coming under EE(WWM-STP)K&T Division CALL-2**
LAST DATE AND TIME FOR RECEIPT OF TENDERS	:	07-07-2025 16:00hrs
TIME AND DATE OF OPENING OF TECHNICAL TENDERS	:	08-07-2025 17:00hrs
PLACE OF OPENING OF TECHINCAL TENDERS	:	Office of The Chief Engineer (Waste Water Management-East) Bangalore Water Supply & Sewerage Board 5th Floor, Cauvery Bhavan, K.G. Road, Bangalore 560009
TIME AND DATE OF OPENING OF PRICE TENDERS	:	Will be intimated to the qualified tenderers
PLACE OF OPENING OF PRICE TENDER	:	Will be intimated to the qualified tenderers
ADDRESS FOR COMMUNICATION	:	Office of The Chief Engineer (Waste Water Management-East) Bangalore Water Supply & Sewerage Board 5th Floor, Cauvery Bhavan, K.G. Road, Bangalore 560009

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BANGALORE WATER SUPPLY AND SEWERAGE BOARD
Office of The Chief Engineer (Waste Water Management-East)
5th Floor, Cauvery Bhavan, K.G. Road, Bangalore-560009

INVITATION FOR TENDER

(ONLY THROUGH KARNATAKA PROCUREMENT PORTAL)

IFT No.: BWSSB/CE (WWM-E)/DCE(WWM-E&W)/TA-1/421/2025-26
Dt: 21-06-2025

SECTION 1
INVITATION FOR TENDER

The Chief Engineer (Waste Water Management-East) invites tenders from eligible tenderers for **: Various Improvement Works taken up under Jal Hi Amrut scheme at 02 MLD Ulsoor STP coming under EE(WWM-STP)K&T Division CALL-2** detailed in the table below. Tenderers are requested to submit their tender, EMD and details of their capability to undertake the tender (as detailed in ITT Clause-3 & 6) in the Karnataka Public Procurement Portal. Pri ce tender will be opened only if the Tenderer is found to be qualified to execute the tendered works. Tenderers are advised to note the minimum qualification criteria specified in clause 3 of the Instructions to Tenderers to qualify for award of the contract.

1. Tender documents may be downloaded through Karnataka Procurement Portal www.kppp.karnataka.gov.in website only from 23-06-2025 **to 07-07-2025**. Interested Tenderers may obtain further information by accessing the same website.
2. Tenders must be accompanied by Earnest Money Deposit specified for the work in the Table below. EMD will have to be in any one of the forms as specified in the Tender document and shall have to be valid for **45** days beyond the validity of the tender.
3. The last date and time for receipt of tenders in the Electronic Tender Box in website (www.kppp.karnataka.gov.in) 07-07-2025 up to 16.00 hrs. The technical bids will be opened on 08-07-2025 at 17:00hrs. If the bid-opening day remains as public holiday, bids will be opened on the next working day at the original stipulated time.

4. Other details can be seen in the tender documents

Sl. No	Name of the work	Tender proces sing	Amount put to tender Rs.	Bid securit y Rs.	Period of completion	Eligibility criteria during last 5 years (2020-21 , 2021-22,2022-23, 2023-24 & 2024-25)

		fee	(approx)	(EMD)			
						Financial Turnover (in all classes of Civil Engg. Construction works) for any of the two years during the last five years Rs.	Performance and work Qualification
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	various Improvement Works taken up under Jal Hi Amrut scheme at 02 MLD Ulsoor STP coming under EE(WWM-STP)K&T Division CALL-2	**As per Karnataka procurement portal.**	**Rs.121.19 Lakhs** **(Excluding GST @ 18%)**	**Rs.1.81 lakhs**	**06 months**	**Rs. 286.01 lakhs**	1). As a Prime Contractor, the tenderer should have satisfactorily completed at least one similar nature of Upgradation / Design and construction of New Sewage Treatment plant including PLC/SCADA /CMSS **of value not less than Rs.71.50 lakhs.** 2) The tenderer should have executed in any one financial year, a minimum quantity of : a. The firm should have carried out Upgradation of sewage treatment plant / Design and construction of New Sewage Treatment plant of Capacity 1.5 MLD including PLC/SCADA /CMSS 3)Each tender should further demonstrate: i) Assessed available tender capacity = (A*N*1.5 - B)>= **Rs. 143.00** lakhs(including GST @18%) 4)Liquid assets and /or availability of credit facilities of not less than **Rs.71.50 lakhs** (Credit lines /letter of credit / certificates from

							Nationalized/ Schedule banks in India for meeting the fund requirement etc.,

NOTE: 1.a The amount put to tender Rs.121.19 Lakhs is Excluding GST at 18% and the bidder should quote for the amount.

b.The GST amount is of Rs.21.81 Lakhs

2.The financial bid evaluation will be based on 1(a) of above Note

5. EMD shall be paid through OTC, NEFT, DEBIT CARD & CREDIT CARD through Karnataka Public Procurement Portal Only. The value of the Bid Security / EMD is as mentioned in the table above in column no 5.
6. Tenderers can access tender documents from www.kppp.karnataka.gov.in website only and upload the required details; those are mentioned in different sections in the bid document in to electronic tender on the website. Scanned documents those are required to be furnished as per Section 2, 3 & 4 of the bid document shall be submitted through Karnataka Public Procurement Portal.
7. The Tender processing fee once paid will not be refunded.
8. The successful Tenderer would be required to furnish the performance Bank Guarantee from a Nationalized / Scheduled Indian Bank, with jurisdiction at Bangalore as specified, towards guarantee for completion of work within the stipulated period as mentioned in tender document.
9. Applications / requisitions from joint venture Firms are not acceptable.
10. Bangalore Water Supply and Sewerage Board (BWSSB) reserves the right to cancel or annul the entire or part of this process of invitation at any time without assigning any reasons.
11. For any additional information regarding the above tender, the firms who are interested to quote, may contact office of the undersigned at the office address given below on all working days during office hours (10:30hours to 17:00 hours).

Bangalore Water Supply & Sewerage Board
Office of Chief Engineer (Waste Water Management-East)
5th Floor, Cauvery Bhavan,
K.G.Road, Bangalore.
Telefax:080-22945106

12. Tenderers shall submit offers that comply with the requirements of the bid document.
13. Successful Bidder has to follow the SWD (Solid Waste Management Rules 2016) in this tender work.

Corrigendum / Modification / Corrections, if any will be published in the website only.

Sd/-
Chief Engineer
(Waste Water Management-East)

SECTION 2:

INSTRUCTIONS TO TENDERERS (ITT)

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A. General

1. Scope of Tender

1.1 The **Chief Engineer (WWM-E),** (Referred to as Employer in these documents) invites tenders following Two Stage Karnataka Public Procurement Portal procedure, from eligible Tenderers, **: Various Improvement Works taken up under Jal Hi Amrut scheme at 02 MLD Ulsoor STP coming under EE(WWM-STP)K&T Division CALL-2 (**as defined in these documents and referred to as "the work") detailed in the Table given in the Invitation for Tenders (IFT).

2. **Eligible Tenderers**

2.1 Tenderers shall not be under a declaration of ineligibility for corrupt and fraudulent practices issued by the Government of Karnataka

2.2 Tenders from Joint ventures are not acceptable.

3. Qualification of the Tenderer:

3.1 All Tenderers shall provide the requested information accurately and in sufficient
detail in Section 3: Qualification information.

3.2 To qualify for award of this contract, each Tenderer in its name should have in the
last five years i.e. (2020-21 to 2024-25)

a) Achieved in at least two financial years a minimum financial turnover (in all classes of civil engineering construction works only) of **Rs.286.01 Lakh.**

i) As a Prime Contractor, the tenderer should have satisfactorily completed at least one similar nature of Upgradation / Design and construction of New Sewage Treatment plant including PLC/SCADA /CMSS **of value not less than Rs.71.50 lakhs.**

ii) The tenderer should have executed in any one financial year, a minimum quantity of

a) The firm should have carried out Upgradation of sewage treatment plant / Design and construction of New Sewage Treatment plant of Capacity 1.5 MLD including PLC/SCADA /CMSS

0
1 3.3 Each Tenderer should further demonstrate:
2

b. Liquid assets and /or availability of credit facilities of not less than **Rs.71.50 lakhs.** (Credit lines/letter of credit/certificates from Nationalised / Schedule banks in India for meeting the fund requirement etc.,

3.4 To qualify for a package of contracts made up of this and other contracts for which tenders are invited in this IFT, the tenderer must demonstrate having experience and resources to meet the aggregate of the qualifying criteria for the individual contracts.

3.5 Sub-contractors experience and resources shall not be taken into account in determining the Tenderers compliance with the qualifying criteria except to the extent stated in 3.2 above.

3.6 Tenderers who meet the above specified minimum qualifying criteria, will only be qualified, if their available tender capacity is more than the total tender value. The available tender capacity will be calculated as under:

a) Assessed available tender capacity = (A*N*1.5 - B)>= 143.00 Lakhs (Amount put to tender including GST@18%)

where

A = Maximum value of civil engineering works executed in any one year during the last five years (updated to 2023-24 price level at 10% per year) taking into account the completed as well as works in progress.

N = Number of years prescribed for completion of the works for which tenders are invited.

B = Value, at 2023-24 price level, of existing commitments and on-going works to be completed during the next **06 months.**

Note: The statements showing the value of existing commitments and on-going works as well as the stipulated period of completion remaining for each of the works listed should be countersigned by the Employer in charge, not below the rank of an Executive Engineer or equivalent.

3.7 Even though the Tenderers meet the above criteria, they are subject to be disqualified if they have:

- made misleading or false representations in the forms, statements and attachments submitted in proof of the qualification requirements; and/or
- record of poor performance such as abandoning the works, not properly completing the contract, inordinate delays in completion, litigation history, or financial failures etc.; and/or
- participated in the previous Tender for the same work and had quoted unreasonably high tender prices and could not furnish rational justification.

3.8 All the Electromechanical equipment should be compatible with the existing system. The manufacturer should be an approved vendor of BWSSB. Also, prior approval (Drawings & QAP) is required for each equipment from the BWSSB.

3.9 Factory inspection is mandatory for all the equipments and the performance test to be conducted at the factory and at site

after commissioning. The contractor is responsible for making all the arrangements for the inspection.

4. One Tender per Tenderer:

4.1 Each tenderer shall submit only one tender for one package. A tenderer who submits or participates in more than one tender (other than as a sub-contractor or in cases of alternatives that have been permitted or requested) will cause all the proposals with the Tenderer's participation to be disqualified.

5. Cost of Tendering:

5.1 The tenderer shall bear all costs associated with the preparation and submission of his tender, and the Employer will in no case be responsible and liable for those costs.

6. Site visit:

6.1 The Tenderer at his own responsibility and risk is encouraged to visit and examine the Site of Works and its surroundings and obtain all information that may be necessary for preparing the Tender and entering into a contract for construction of the Works. The costs of visiting the Site shall be at the Tenderers own expense.

B. Tender documents

7. Content of Tender documents

7.1 The set of tender documents shall have all the Sections given in Page 2:

7.2 Both the sets should be completed and uploaded with the tender.

8. Clarification of Tender Documents

8.1 A prospective tenderer requiring any clarification of the tender documents may notify the Employer by posting in the web site (Karnataka public procurement→My tenders→action→queries). No identity of the participating tenderer shall be mentioned in the query. All queries & replies can be viewed by all participating tenderers.

8.2 Pre-tender meeting: ***Deleted***

9. Amendment of Tender documents

9.1 Before the deadline for submission of tenders, the Employer may modify the tender documents by issuing addenda.

9.2 Any addendum thus issued shall be part of the tender documents and shall be posted in the Karnataka public procurement portal website for viewing by all the purchasers of the tender documents.

9.3 To give prospective Tenderers reasonable time in which to take an addendum into account in preparing their tenders, the Employer shall extend as necessary the deadline for submission of tenders, in accordance with Sub-Clause 16.2 below.

C. Preparation of Tenders

10. Documents comprising the Tender

10.1.1 The tender submitted in Karnataka Public Procurement Portal by the Tenderer shall contain the documents as follows:

a) Scanned copy of Earnest Money Deposit.
b) The form of Tender (in the format indicated in Section 4)
c) Scanned copies of the certificates supporting the Qualification as in Section 3. Any other materials required to be completed and submitted by Tenderers in accordance with these instructions. The documents listed under Sections 3, 4, 6 and 9 shall be filled in without exception. PHOTOCOPIES OF THE DOCUMENTS SHOULD BE NOTARISED.

10.1.2 Rates for the Bill of Quantities (Section 9) shall be quoted at the provision made in the Karnataka Public procurement website Portal.

10.2 Tenderers submitting tenders together with other contracts stated in the IFT to form a package will so indicate in the tender together with any discounts offered for the award of more than one contract.

11. Tender prices

11.1 The contract shall be for the whole works as described in Sub-Clause 1.1, based on the priced Bill of Quantities submitted by the Tenderer.

11.2 The Tenderer shall fill in the unit rates in figures for all items of the Works described in the Bill of Quantities. The system will automatically calculate the amount of that item as well as the total Tender value. ***Items for which no rate is entered by the Tenderer will not be paid for by the Employer when executed and shall be deemed covered by the other rates in the Bill of Quantities***

11.3 All duties, taxes, and other levies payable by the contractor under the contract, or for any other cause, shall be included in the rates, prices and total Tender Price submitted by the Tenderer.

11.4 DELETED

12. Tender validity

12.1 Tenders shall remain valid for a period not less than **ninety days** after the deadline date for tender submission specified in Clause 16. A tender valid for a shorter period shall be rejected by the Employer as non-responsive.

12.2 In exceptional circumstances, prior to expiry of the original time limit, the Employer may request that the Tenderers may extend the period of validity for a specified additional period. The request and the Tenderers responses shall be made in writing or e-mail. A Tenderer may refuse the

request without forfeiting his earnest money deposit. A Tenderer agreeing to the request will not be required or permitted to modify his tender, but will be required to extend the validity of his earnest money deposit for a period of the extension, and in compliance with Clause13 in all respects.

13. Earnest money deposit

13.1 Earnest Money Deposit shall be paid through Karnataka Procurement Portal only using any of the following four modes.

i. Credit Card (Online Payment)
ii. Direct Debit Using Internet Banking (Online Payment)
iii. Remittance at the Bank Counter - Challan (Offline Payment)
iv. NEFT (Offline payment).

13.2 Instruments having fixed validity issued as earnest money deposit for the tender shall be valid for 45 days beyond the validity of the tender.

13.3 Any tender not accompanied by an acceptable earnest money deposit and not secured as indicated in Sub-Clauses 13.1 and 13.2 above shall be rejected by the Employer as non-responsive.

13.4 The earnest money deposit of unsuccessful Tenderers will be returned within 30 days of the end of the tender validity period specified in Sub-Clause 12.1.

13.5 The earnest money deposit of the successful Tenderer will be discharged when the Tenderer has signed the Agreement and furnished the required Performance Security.

13.6 The Earnest money deposit may be forfeited:

a) if the Tenderer withdraws the Tender after tender opening during the period of tender validity;
b) if the Tenderer does not accept the correction of the Tender Price, pursuant to Clause 24; or
c) in the case of a successful Tenderer, if the Tenderer fails within the specified time limit to
   (i) Sign the Agreement; or
   (ii) Furnish the required Security deposit

14. Format and signing of Tender

14.1 The completed tender comprising of documents indicated in ITT 10, should be uploaded in the Karnataka Public Procurement Portal website along with scanned copies of requisite certificates those are mentioned in different sections in the bid document and scanned copy of tender Security / EMD.

14.2 All the documents should be uploaded in Karnataka Public Procurement website. Tenderer should take a print out of the Form of Tender in the Section 4 of the tender document on company letter head and should sign, stamp and upload the same to the tender. Authenticity of the singing authority shall be furnished. With this, it is taken that tenderer has signed & submitted the tender.

14.3 The Tender shall contain no alterations or additions, except those to comply with instructions issued by the Employer.

D. Submission of Tenders

15. Up-loading & submission of tenders

15.1 The tenders should be uploaded only through Karnataka Public Procurement Website. Tender should contain

A. Technical Tender consisting of following:

a. All the documents with required details in prescribed format; those are mentioned in different sections in the Tender. Form of Tender, etc., shall be downloaded, filled with required details, signed, scanned & uploaded to the Karnataka Public Procurement Portal (www.kppp.karnataka.gov.in)

b. The above documents along with notarized copies of documentary evidences as indicated in Section—2 of ITT, Section-3 Qualification information & Section-4 Forms of Tender shall be scanned and uploaded to the website compulsorily, failing which tender will be rejected in view of incomplete tender document and

B. Financial Tender consisting of Bill of Quantities

15.1 All rates for the items in the Schedule shall be posted in the work template provided in the tender document. Rates shall be entered in figures only.

15.2 DELETED

15.3 BID reference Number will be automatically generated by the server.

15.4 DELETED

16. Deadline for submission of the Tenders

16.1 DELETED.

16.2 The Employer may extend the deadline for submission of tenders by issuing an amendment in accordance with Clause 9, in which case all rights and obligations of the Employer and the Tenderers previously subject to the original deadline will then be subject to the new deadline.

17. Late Tenders

17.1 The software of Karnataka Public Procurement website system will not allow the Tenderer to upload the documents after expiration of the stipulated date & time of Bid submission. The Tenderer shall refer the server time, which will be displayed in the Karnataka Public Procurement Portal. BWSSB will not be responsible for non-receipt of bids on the stipulated date & time prescribed in clause 16, due to Internet Problems, improper uploading or any other related problems. In case of connectivity problems, Tenderer may contact Helpdesk of the Karnataka Public Procurement Portal service provider and may also draw the attention of tender inviting authority.

18. Modification and Withdrawal of Tenders

18.1 Tenderers may “modify” and “withdraw” their tenders multiple numbers of times, until the deadline for submission of tenders by operating the relevant provision made in Karnataka Public Procurement Portal.If the Tenderer withdraws the tender before the deadline for submission of tenders and later if he is interested to submit the tender once again, may do so within the stipulated date & time as mentioned in Clause 16. In this case within the stipulated date & time, the tenderer can once again submit the requisition to the officer inviting tenders for access to the withdrawn tender document for resubmission. For this tenderer need not make any additional payment towards the cost of tender document. Communication of modification / withdrawal by other means will not be accepted.

18.2 DELETED

18.3 No Tender may be modified after the deadline for submission of Tenders.

18.4 Withdrawal or modification of a Tender between the deadline for submission of Tenders and the expiration of the original period of Tender validity specified in Clause 12.1 above or as extended pursuant to Clause 12.2 may result in the forfeiture of the earnest money deposit pursuant to Clause 13.

18.5 DELETED

E. Tender opening and evaluation

19. Opening of Technical Bid of Tenders and evaluation to determine qualified Tenderers:

19.1 The Employer will open the Technical details of all the Tenders received (except those withdrawn), including modifications made pursuant to Clause 18, in the presence of the Tenderers or their representatives who choose to attend at the Employer’s office mentioned in the earlier para at 15:00 hours on the date and the place specified. In the event of the specified date of Tender opening being declared a holiday for the Employer, the Tenders will be opened at the appointed time and location on the next working day.

19.2 WITHDRAWAL proposal submitted pursuant to clause 18 shall be read out first and their bids shall not be opened.

19.3 The Tenderers names, the presence or absence of earnest money deposit (amount, format and validity), the submission of qualification information and such other information as the Employer may consider appropriate will be announced by the Employer at the opening.

19.4 The Employer shall prepare minutes of the Tender opening, including the information disclosed to those present in accordance with Sub-Clause 19.3.

19.5 The Price Tenders of all the Tenderers including modifications for financial tenders cannot be opened as this is programmed to open later after evaluation of the Technical details of the participating Tenderers.

19.6 The Employer will evaluate and determine whether each tender (a) meets the eligibility criteria defined in ITT Clause 2; (b) is accompanied by the required earnest money deposit as per stipulations in ITT Clause and (c) meets the minimum qualification criteria stipulated in ITT Clause 3. The Employer will draw out a list of qualified Tenderers.

20. Opening of Financial Bid of qualified Tenderers and evaluation:

20.1 The Employer will inform all the Qualified Tenderers the time, date and venue fixed for the opening of the price Tenders. The Employer will open the price tender of Qualified Tenderers at the appointed time and date in the presence of the Tenders or their representatives who choose to attend. In the event of the specified date of Price tender opening being declared a holiday for the Employer, the price tenders will be opened at the appointed time and location on the next working day.

20.2 DELETED

20.3 The Tenderers' names, the Tender prices, the total amount of each Tender, any discounts, and withdrawals, and such other details as the Employer may consider appropriate, will be announced by the Employer at the opening. No Tender shall be rejected at Tender opening.

20.4 The Employer shall prepare minutes of the Price Tender opening, including the information disclosed to those present in accordance with Sub-Clause 20.3.

21. Process to be confidential

21.1 Information relating to the examination, clarification, evaluation, and comparison of Tenders and recommendations for the award of a contract shall not be disclosed to Tenderers or any other persons not officially concerned with such process until the award to the successful Tenderer has been announced. Any effort by a Tenderer to influence the Employer's processing of Tenders or award decisions may result in the rejection of his Tender.

22. Clarification of Tenders

22.1 To assist in the examination, evaluation, and comparison of Tenders, the Employer may, at his discretion, ask any Tenderer for clarification of his Tender, including breakdowns of unit rates. The request for clarification and the response shall be in writing but no change in the price or substance of the Tender shall be sought, offered, or permitted except as required to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the Tenders in accordance with Clause 24.

22.2 Subject to sub-clause 22.1, no Tenderer shall contact the Employer on any matter relating to its Tender from the time of the Tender opening to the time the contract is awarded. If the Tenderer wishes to bring additional information to the notice of the Employer, it should do so in writing.

22.3 Any effort by the Tenderer to influence the Employer in the Employer's Tender evaluation, Tender comparison or contract award decisions may result in the rejection of the Tenderers' Tender.

23. Examination of Tenders and determination of responsiveness

23.1 Prior to the detailed evaluation of Tenders, the Employer will determine whether each Tender; (a) has been properly signed; and; (b) is substantially responsive to the requirements of the Tender documents like (a)Form of Tender, (b)Declaration statement Scanned/ uploaded [including documents those are required to be furnished as per Section 2, 3 & 4 of the tender,]; (c) is accompanied by the required securities and; (d) is substantially responsive to the requirements of the tendering documents.

23.2 A substantially responsive Tender is one which conforms to all the terms, conditions, and specifications of the Tender documents, without material deviation or reservation. A material deviation or reservation is one (a) which affects in any substantial way the scope, quality, or performance of the Works; (b) which limits in any substantial way, inconsistent with the Tender documents, the Employer's rights or the Tenderer's obligations under the Contract; or (c) whose rectification would affect unfairly the competitive position of other Tenderers presenting substantially responsive Tenders.

23.3 If a Tender is not substantially responsive, it will be rejected by the Employer, and may not subsequently be made responsive by correction or withdrawal of the non conforming deviation or reservation.

24. Correction of errors

24.1 Once the Tenderer key in the rates in figures, in the Bill of quantities provided, the system will automatically calculate the amount of that item as well as the total Bid value.

24.2 Deleted

25. Evaluation and comparison of Tenders

25.1 The Employer will evaluate and compare only the Tenders determined to be substantially responsive in accordance with Clause 23.

25.2 In evaluating the Tenders, the Employer will determine for each Tender the evaluated Tender Price by adjusting the Tender Price as follows:

(a) Making any correction for errors pursuant to Clause 24; and

(b) DELETED

25.3 The Employer reserves the right to accept or reject any variation, deviation, or alternative offer. Variations, deviations, and alternative offers and other factors which are in excess of the requirements of the Tender documents or otherwise result in unsolicited benefits for the Employer shall not be taken into account in Tender evaluation.

25.4 DELETED

25.5 If the tender of the successful tenderer is seriously unbalanced in relation to the Employer's estimate of the cost of the work to be performed under the contract, the Employer may require the Tenderer to produce detailed price analyses for any or all items of the Bill of Quantities, to demonstrate the internal consistency of those prices with the construction methods and schedule proposed. After evaluation of the price analyses, the Employer may require that the amount of the performance security set forth in Clause 29 be increased at the expense of the successful Tenderer to a level sufficient to protect the Employer against financial loss in the event of default of the successful under the contract.

F. Award of Contract

26. Award criteria

26.1 Subject to Clause 27, the Employer will award the Contract to the Tenderer whose Tender has been determined to be substantially responsive to the Tender documents and who has offered the lowest evaluated Tender Price, provided that such Tenderer has been determined to be (a) eligible in accordance with the provisions of Clause 2, and (b) qualified in accordance with the provisions of Clause 3.

27. Employer's right to accept any Tender and to reject any or all Tenders

27.1 Not with standing Clause 26, the Employer reserves the right to accept or reject any Tender, and to cancel the Tender process and reject all Tenders, at any time prior to the award of Contract, without thereby incurring any liability to the affected Tenderer or Tenderers or any obligation to inform the affected Tenderer or Tenderers of the grounds for the Employer's action.

28. Notification of award and signing of Agreement

28.1 The Tenderer whose Tender has been accepted will be notified of the award by the Employer prior to expiration of the Tender validity period by writing, e-mail or by registered letter. This letter (hereinafter and in the Conditions of Contract called the "Letter of Acceptance") will state the sum that the Employer will pay the Contractor in consideration of the execution, completion, and maintenance of the Works by the Contractor as prescribed by the Contract (hereinafter and in the Contract called the "Contract Price").

28.2 The notification of award will constitute the formation of the Contract, subject only to the furnishing of Security deposit in accordance with the provisions of Clause 29.

28.3 The Agreement will incorporate all agreements between the Employer and the successful Tenderer. It will be kept ready for signature of the successful Tenderer in the office of Employer within 30 days following the notification of award along with the Letter of Acceptance. Within 20 days of receipt, the successful Tenderer will sign the Agreement and deliver it to the Employer.

28.4 Upon the furnishing by the successful Tenderer of the Performance Security, the Employer will promptly notify the other Tenderers that their Tenders have been unsuccessful.

29. Security deposit

29.1 Within 20 days of receipt of the Letter of Acceptance, the successful Tenderer shall deliver to the Employer a Security deposit in any of the forms given below for an amount equivalent to 5% of the Contract price plus additional security for unbalanced tenders in accordance with Clause 25.5 of ITT and Clause 44 of the Conditions of Contract. :

- A bank guarantee in the form given in Section 10;

29.2 If the security deposit is provided by the successful Tenderer in the form of a Bank Guarantee, it shall be issued either by a Nationalized/Scheduled bank and valid in accordance with Clause 43 of Condition of Contract.

29.3 DELETED

29.4 Failure of the successful Tenderer to comply with the requirements of Sub-Clause 29.1 shall constitute sufficient grounds for cancellation of the award and forfeiture of the Earnest money deposit.

30. DELETED

31. Corrupt or Fraudulent practices

31.1 The GOK requires that the Tenderers/Suppliers/Contractors, observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, GOK :

a) will reject a proposal for award if it determines that the Tenderer recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question;

b) will declare a firm ineligible, either indefinitely or for a stated period of time, to be awarded a GOK contract if it at any time determines that the firm has engaged in corrupt or fraudulent practices in competing for, or in executing, a GOK contract.

31.2 Furthermore, Tenderers shall be aware of the provision stated in sub-clause 50.2 of the Conditions of Contract.

Sd/-

Chief Engineer (Waste Water Management-East)

SECTION 3:

QUALIFICATION INFORMATION

The following form is to be downloaded, particulars are to be filled, scanned & uploaded by the Tenderer.

The information to be filled in by the Tenderer hereunder will be used for purposes of computing Tender capacity as provided for in Clause 3 of the Instructions to Tenderers. This information will not be incorporated in the Contract.

1.1 Constitution or legal status of Tenderer [Attach copy]
Place of Registration _____
(Attach Copy)
Principal place of business: _____

1.2 Total value of civil engineering construction works executed and payments received in the last five years (in **Rs** Lakh)[attach certificate of Chartered accountant]

2020 – 21
2021– 22
2022– 23
2023 - 24
2024- 25

1.3 Work performed as Prime Contractor (in the same name) on works of similar nature over during the five years specified in 1.2 above.

Project Name	Name of Employer	Description of Work	Contract Number	Value of contract Rs. Lakh	Date of issue of work order	Specified period of completion	Actual date of completion	Remarks explaining reasons for delay in completion of work
1	2	3	4	5	6	7	8	9

1.4 Quantities of work executed as prime contractor (in the same name) during the last five years specified in 1.2 above: [to support the qualification criteria in ITT clause 3]

Year	Name of Work	Name of Employer	Quantity of work performed (cum)		Remarks (Indicate contract reference)

1.5 Information on works for which Tenders have been submitted and works which are yet to be completed as on the date of this Tender.

(A) Existing commitments and on-going works:

Description of Work	Place & State	Contract No. & Date	Name and Address of Employer	Value of Contract (Rs. Lakh)	Stipulated period of completion	Value of works remaining to be completed (Rs. Lakh)	Anticipated date of completion
1	2	3	4	5	6	7	8

(B) Works for which Tenders already submitted:

Description of Work	Place & State	Name and Address of Employer	Estimated value of works (Rs. Lakh)	Stipulated Date period of completion	when decision is expected	Remarks if any
1	2	3	4	5	6	7

1.6 Items of equipment essential for carrying out the works.

Item of Equipment	Requirement			Owned and available		Remarks
	No.	Capacity	Owned	Number/ Capacity	Age/ Condition	

1.7 Reports on the financial standing of the tenderer, such as profit and loss statements and auditor’s reports for the last five years;

1.8 Qualification and experience of the key technical and management personnel in permanent employment with the tenderer and those that are proposed to be deployed on this contract, if awarded.

1.9. Name, address, and telephone, telex, and fax numbers of the Tenderers' bankers who may provide references if contacted by the Employer.

1.10 Evidence of access to financial resources to meet the qualification requirement specified in ITT Clause3.3 (b): Cash in hand, Letter of Credit etc. List them below and attach certificate from the Banker in the suggested format as under:

BANKER'S CERTIFICATE

This is to certify that M/s. ..... is a reputed company with a good financial standing. If the contract for this work, namely ..... (name of the work) is awarded to the above firm, we shall be able to provide overdraft/credit facilities to the extent of Rs. ..... to meet the working capital requirements for executing the above contract

Sd/-
Name of the Bank, Senior Bank Manger
Address:
.....

1.11 Proposals for subcontracting components of works amounting to more than 20% of the contract price .

Item of Work	Value of Sub-Contract	Identified Sub-Contractor (Name and address)	Experience of similar work

1.12 Information on litigations in which the Tenderer is involved:

Other Party (ies)	Employer	Details of dispute	Amount involved	Remarks showing present status

1.13 The proposed methodology and program of construction, backed with equipment planning and deployment, duly supported with broad calculations and quality control procedures proposed to be adopted, justifying their capability of execution and completion of the work as per technical specifications within the stipulated period of completion as per milestones.

Sd/-

Chief Engineer

(Waste Water Management-East)

SECTION 4:

[Tenderer shall down load this page, print on the letter head, fill the gaps with signature, scan the sheet & upload to the website. Failing which the tender will be treated as non-responsive]

FORMS OF TENDER, LETTER OF ACEPTANCE, NOTICE TO PROCEED WITH THE WORK AND AGREEMENT FORM

Form of Tender

Description of the Work: **:Various Improvement Works taken up under Jal Hi Amrut scheme at 02 MLD Ulsoor STP coming under EE(WWM-STP)K&T Division CALL-2**

To

The Chief Engineer (Waste Water Management-East)
Bangalore Water Supply & Sewerage Board
5th Floor, Cauvery Bhavan D-Block,
K.G. Road, Bangalore 560009

GENTLEMEN,

We offer to execute the Works described above in accordance with the Conditions of Contract accompanying this Tender for the Contract Price uploaded for this tender to be opened after qualification.

This Tender and your written acceptance of it shall constitute a binding contract between us. We understand that you are not bound to accept the lowest or any Tender you receive.

We undertake that, in competing for (and, if the award is made to us, in executing) the above contract, we will strictly observe the laws against fraud and corruption in force in India namely “Prevention of Corruption Act 1988”.

We hereby confirm that this Tender complies with the Tender validity and Earnest money deposit required by the Tender documents.

We attach herewith our current income-tax clearance certificate.

Yours faithfully,
Authorized Signature:

Name & Title of Signatory:

_____

Name of Tenderer _____

Address: ----------

Letter of Acceptance
(letterhead paper of the Employer)

_____[date]

To:
_____[name and address of the Contractor]

Dear Sirs,

This is to notify you that your Tender dated _____ for execution of the _____[name of the contract and identification number, as given in the Instructions to Tenderers] for the Contract Price of Rupees _____ —— _____ (_____) [amount in words and figures], as corrected and modified in accordance with the Instructions to Tenderers is hereby accepted by our Agency.

You are hereby requested to furnish Security deposit plus additional security for unbalanced tenders in terms of Clause 25.5 of ITT, in the form detailed in Clause 29.1 of ITT for an amount of Rs.————— within 20 days of the receipt of this letter of acceptance valid up to 30 days from the date of expiry of Defects Liability Period i.e. up to ..... and sign the contract, failing which action as stated in Para 29.4 of ITT will be taken.

Yours faithfully,

Authorized Signature
Name and Title of Signatory
Name of Agency

Issue of Notice to proceed with the work

(letterhead of the Employer)

——————— (date)

To
——————————————————— (name and address of the Contractor)
———————————————————
———————————————————

Dear Sirs:

Pursuant to your furnishing the requisite security deposit as stipulated in ITT Clause 29.1 and signing of the contract agreement for the construction of ———————[name of the contract] a Tender Price of Rs.———————, you are hereby instructed to proceed with the execution of the said works in accordance with the contract documents.

Yours faithfully,

(Signature, name and title of signatory authorized to sign on behalf of Employer)

Agreement Form
Agreement

This agreement, made the _____day of _____20_____, between_____ _____[name and address of Employer] (hereinafter called "the Employer") of the one part and _____ _____ _____ _____[name and address of contractor] (hereinafter called "the Contractor") of the other part.

Whereas the Employer is desirous that the Contractor execute _____ _____[name and identification number of Contract] (hereinafter called "the Works") and the Employer has accepted the Tender by the Contractor for the execution and completion of such Works and the remedying of any defects therein at a contract price of Rupees.....

NOW THIS AGREEMENT WITNESSETH as follows:

1. In this Agreement, words and expression shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to, and they shall be deemed to form and be read and construed as part of this Agreement.

2. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute and complete the Works and remedy any defects therein in conformity in all aspects with the provisions of the Contract.

3. The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying the defects wherein the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

4. The following documents shall be deemed to form and be read and construed as part of this Agreement, viz:
   i) Letter of Acceptance;
   ii) Notice to proceed with the works;
   iii) Contractor's Tender;
   iv) Contract Data;
   v) Conditions of contract (including Special Conditions of Contract);
   vi) Specifications;

vii) Drawings;
viii) Bill of Quantities; and
ix) Any other document listed in the Contract Data as forming part of the contract.

Whereas, the parties now mutually agree to the following conditions of Contract.

5. Jurisdiction of Courts/Arbitration: The Sitting of arbitration shall be held at Bangalore only and nowhere else.
6. Dispute of any kind arising out of the contract shall be resolved within the jurisdiction of Bangalore city only and the parties agree and clearly understand that the courts/ tribunals situated at Bangalore Metropolitan City have exclusive jurisdiction for the redressal of the disputes arising out of the contract and at no other place.
7. The parties further agree and understand that the place or places of issue of bank guarantee other than Bangalore will have no jurisdiction to resolve dispute of any kind relating to enforcement of the bank guarantees submitted by the contractor at Bangalore for the execution of the contract at Bangalore.
8. The contractor shall comply with all the legal requirements in the matter of employment of workmen and provide all safety gadgets to the workmen while working in the hazards place of conditions during the execution of the contract.
9. Contractor shall be fully responsible in the event of death of employee/ workman during the execution of the work and liable to pay adequate compensation to the dependants of employee/ workman as per law.
10. On his/ their failure, if the Board is made to pay compensation the same shall be recovered by the Board from the contractor out of the amounts due to the contractor or by appropriate legal action.
11. If death of any employees occurs during execution of work due to negligence of contractor, the contract will be liable for termination.
12. In the event of such termination, the employer may consider blacklisting of firm after due notice.
13. In case of any death or accident the contract will be cancelled after following due process.

14. The Board will be entitled to claim exemplary damages from the contractor in case of death of any work man / employees of the contractor in any of the BWSSB works as it damages the reputation of

In witness whereof the parties thereto have caused this Agreement to be executed the day and year first before written.

The Common Seal of _____
was hereunto affixed in the presence of:

Signed, Sealed and Delivered by the said _____
in the presence of:

Binding Signature of Employer _____

Binding Signature of Contractor _____

SECTION 5: CONDITIONS OF CONTRACT

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Conditions of Contract

A. General

1. Definitions

1.1 Terms which are defined in the Contract Data are not also defined in the Conditions of Contract but keep their defined meanings. Bold letters are used to identify defined terms.

Bill of Quantities means the priced and completed Bill of Quantities forming part of the Tender.

Compensation events are those defined in Clause 38 hereunder.

The **Completion Date** is the date of completion of the Works as certified by the Employer in accordance with Sub Clause 46.1.

The **Contract** is the contract between the Employer and the Contractor to execute, complete and maintain the Works. It consists of the documents listed in Clause 2.2 below.

The **Contract Data** defines the documents and other information which comprise the Contract.

The **Contractor** is a person or corporate body whose Tender to carry out the Works has been accepted by the Employer.

The **Contractor's Tender** is the completed Tender document submitted by the Contractor to the Employer.

The **Contract price** is the price stated in the Letter of Acceptance and thereafter as adjusted in accordance with the provisions of the Contract.

Days are calendar days; months are calendar months.

A **Defect** is any part of the Works not completed in accordance with the Contract.

The **Defects liability period** is the period named in the Contract Data and calculated from the Completion Date.

The **Employer** is the party who will employ the Contractor to carry out the Works.

Equipment is the Contractor's machinery and vehicles brought temporarily to the Site to construct the Works.

The **Initial Contract price** is the Contract Price listed in the Employer's Letter of Acceptance.

The **Intended Completion Date** is the date on which it is intended that the Contractor shall complete the Works. The Intended Completion Date is specified in the Contract Data. The Intended Completion Date may be revised only by the Employer by issuing an extension of time.

Materials are all supplies, including consumables, used by the contractor for incorporation in the Works.

Plant is any integral part of the Works which is to have a mechanical, electrical, electronic or chemical or biological function.

The **Site** is the area defined as such in the Contract Data.

Specification means the Specification of the Works included in the Contract and any modification or addition made or approved by the Employer.

The **Start Date** is given in the Contract Data. It is the date when the Contractor shall commence execution of the works. It does not necessarily coincide with any of the Site Possession Dates.

A **Subcontractor** is a person or corporate body who has a Contract with the Contractor to carry out a part of the work in the Contract which includes work on the Site.

A **Variation** is an instruction given by the Employer which varies the Works.

The **Works** are what the Contract requires the Contractor to construct, install, and turn over to the Employer, as defined in the Contract Data.

2. Interpretation

2.1 In interpreting these Conditions of Contract, singular also means plural, male also means female or neuter, and the other way around. Headings have no significance. Words have their normal meaning under the language of the Contract unless specifically defined. The Employer will provide instructions clarifying queries about the Conditions of Contract.

2.2 The documents forming the Contract shall be interpreted in the following order of priority:

(1) Agreement
(2) Letter of Acceptance, notice to proceed with the works
(3) Contractor’s Tender
(4) Contract Data
(5) Conditions of Contract
(6) Specifications
(7) Drawings
(8) Bill of quantities and
(9) any other document listed in the Contract Data as forming part of the Contract.

3. Law governing contract

3.1 The law governing the Contract is the Laws of India supplanted by the Karnataka Local Acts.

4. Employer's decisions

4.1 Except where otherwise specifically stated, the Employer will decide contractual matters between the Employer and the Contractor.

5. Delegation

5.1 The Employer may delegate any of his duties and responsibilities to other people after notifying the Contractor and may cancel any delegation after notifying the Contractor.

6. Communications

6.1 Communications between parties which are referred to in the conditions are effective only when in writing. A notice shall be effective only when it is delivered (in terms of Indian Contract Act).

7. Subcontracting

7.1 The Contractor may subcontract with the approval of the Employer but may not assign the Contract without the approval of the Employer in writing. Subcontracting does not alter the Contractor's obligations.

8. Other Contractors

8.1 The Contractor shall cooperate and share the Site with other contractors, public authorities, utilities, and the Employer.

9. Personnel

9.1 The Contractor shall employ the technical personnel (of number and qualifications) as may be stipulated by GOK from time to time during the execution of the work. The technical staff so employed shall be available at site as may be stipulated by the Employer.

9.2 If the Employer asks the Contractor to remove a person who is a member of the Contractor’s staff or his work force stating the reasons, the Contractor shall ensure that the person leaves the Site within seven days and has no further connection with the work in the Contract.

10. Employer’s and Contractor's risks

10.1 The Employer carries the risks which this Contract states are Employer’s risks, and the Contractor carries the risks which this Contract states are Contractor’s risks.

11. Employer's risks

11.1 The Employer is responsible for the excepted risks which are:

(a) Rebellion, riot commotion or disorder unless solely restricted to employees of the Contractor or his Sub-Contractors arising from the conduct of the Works; or

(b) A cause due solely to the design of the Works, other than the Contractor’s design; or

(c) any operation of the forces of nature (in so far as it occurs on the Site) which an experienced contractor:

(i) could not have reasonably foreseen; or

(ii) could reasonably have foreseen, but against which he could not reasonably have taken at least one of the following measures;
(A) prevent loss or damage to physical property from occurring by taking appropriate measures or
(B) insure against such loss or damage

12. Contractor's risks

12.1 All risks of loss of or damage to physical property and of personal injury and death which arise during and in consequence of the performance of the Contract other than the excepted risks are the responsibility of the Contractor.

13. Insurance:

13.1 The Contractor shall prior to commencing the works, effect and thereafter maintain insurances , in the joint names of the Employer and the Contractor, (cover from the first working day after the Start Date to the end of Defects Liability Period), in the amounts stated in the Contract Data :
(a) for loss of or damage to the Works, Plants and Materials and the Contractor's equipment;
(b) for liability of both Parties for loss, damage, death and injury to third parties or their property arising out of the Contractor's performance of the Contract including the Contractor's liability for damage to the Employer's property other than the Works and
(c) for liability of both Parties and of any Employer's representative for death and injury to the Contractor's personnel except to the extent that liability arises from the negligence of the Employer, any Employer's representative or their Employees.

13.2 Policies and certificates for insurance shall be delivered by the Contractor to the Employer for his approval before the Start Date. All such insurance shall provide for compensation to be payable to rectify the loss or damage incurred. All payments received from insurers relating to loss or damage shall be held jointly by the Parties and used for the repair of the loss or damage or as compensation for loss or damage that is not to be repaired.

13.3 If the Contractor fails to effect or keep in force any of the insurances referred to in the previous sub-clauses or fails to provide satisfactory evidence, policies or receipts, the Employer may without prejudice to any other right or remedy, effect insurance for the cover relevant to such default and pay the premiums due and recover the same as a deduction from any other monies due to the Contractor. If no payments is due, the payment of the premiums shall be a debt due.

13.4 Alterations to the terms of an insurance shall not be made without the approval of the Employer.

13.5 Both Parties shall comply with any conditions of the insurance policies.

14. Site Investigation Reports:

14.1 The Contractor, in preparing the tender, shall rely on any site investigation reports referred to in the Contract data, supplemented by any information available to the Tenderer.

15. Queries about the Contract Data

15.1 The Employer will clarify queries on the Contract Data.

16. Contractor to construct the Works

16.1 The Contractor shall construct the Works in accordance with the Specification and Drawings.

17. The Works to be completed by the Intended Completion Date

17.1 The Contractor may commence execution of the Works on the Start Date and shall carry out the Works in accordance with the program submitted by the Contractor, as updated with the approval of the Employer, and complete them by the Intended Completion Date.

18. Approval by the Employer:

18.1 The Contractor shall submit Specification and drawings showing the proposed Temporary Works to the Employer, who is to approve them if they comply with the Specifications and Drawings.

18.2 The Contractor shall be responsible for the design of Temporary Works

18.3 The Employer’s approval shall not alter the Contractor’s responsibility for design of the Temporary Works.

18.4 The Contractor shall obtain approval of third parties to the design of third parties to the design of the temporary Works where required.

18.5 All Drawings prepared by the Contractor for the execution of the temporary or permanent Works, are subject to prior approval by the Employer before their use.

19. Safety

19.1 The Contractor shall be responsible for the safety of all activities on the Site.

20. Discoveries

20.1 Anything of historical or other interest or of significant value unexpectedly discovered on the Site is the property of the Employer. The Contractor is to notify the Employer of such discoveries and carry out the Employer's instructions for dealing with them.

21. Possession of the Site

21.1 The Employer shall give possession of all parts of the Site to the Contractor. If possession of a part is not given by the date stated in the Contract Data the Employer is deemed to have delayed the start of the relevant activities and this will be Compensation Event.

22. Access to the Site

22.1 The Contractor shall allow the Employer and any person authorized by the Employer access to the Site, to any place where work in

connection with the Contract is being carried out or is intended to be carried out and to any place where materials or plant are being manufactured / fabricated / assembled for the works.

23. Instructions

23.1 The Contractor shall carry out all instructions of the Employer which comply with the applicable laws where the Site is located.

24. Procedure for resolution of Disputes:

24.1 If the Contractor is not satisfied with the decision taken by the Employer, the dispute shall be referred by either party to Arbitration within 30 days of the notification of the Employer's decision.

24.2 If neither party refers the dispute to Arbitration within the above 30 days, the Employer's decision will be final and binding.

24.3 The Arbitration shall be conducted in accordance with the arbitration procedure stated in the Special Conditions of Contract.

B. Time Control

25. Program

25.1 Within the time stated in the Contract Data the Contractor shall submit to the Employer for approval a Program showing the general methods, arrangements, order, and timing for all the activities in the Works.

25.2 The Employer's approval of the Program shall not alter the Contractor's obligations. The Contractor may revise the Program and submit it to the Employer again at any time. A revised Program is to show the effect of Variations and Compensation Events.

26. Extension of the Intended Completion Date

26.1 The Employer shall extend the Intended Completion Date if a Compensation Event occurs or a Variation is issued which makes it impossible for Completion to be achieved by the Intended Completion Date.

26.2 The Employer shall decide whether and by how much to extend the Intended Completion Date within 21 days of the Contractor asking the Employer for a decision upon the effect of a Compensation Event or Variation and submitting full supporting information.

27. Delays ordered by the Employer

27.1 The Employer may instruct the Contractor to delay the start or progress of any activity within the Works.

28. Management meetings

28.1 The Employer may require the Contractor to attend a management meeting. The business of a management meeting shall be to review the progress achieved and the plans for remaining work.

28.2 The responsibility of the parties for actions to be taken is to be decided by the Employer either at the management meeting or after the management meeting and stated in writing to be distributed to all who attended the meeting.

C. Quality Control

29. Identifying defects

29.1 The Employer shall check the Contractor's work and notify the Contractor of any Defects that are found. Such checking shall not affect the Contractor's responsibilities. The Employer may instruct the Contractor to search for a Defect and to uncover and test any work that the Employer considers may have a Defect

30. Tests

30.1 If the Employer instructs the Contractor to carry out a test not specified in the Specification to check whether any work has a Defect and the test shows that it does, the Contractor shall pay for the test and any samples. If there is no Defect the test shall be a Compensation Event.

31. Correction of defects

31.1 The Employer shall give notice to the Contractor of any Defects before the end of the Defects Liability Period, which begins at Completion and is defined in the Contract Data. The Defects Liability Period shall be extended for as long as Defects remain to be corrected.

31.2 Every time notice of a Defect is given, the Contractor shall correct the notified Defect within the length of time specified by the Employer’s notice.

32. Uncorrected defects

32.1 If the Contractor has not corrected a Defect within the time specified in the Employer’s notice, the Employer will assess the cost of having the Defect corrected, and the Contractor will pay this amount.

1

2 D. Cost Control

33. Bill of Quantities (BOQ)

33.1 The BOQ shall contain items for the construction, installation, testing, and commissioning work to be done by the Contractor.

33.2 The BOQ is used to calculate the Contract Price. The Contractor is paid for the quantity of the work done at the rate in the BOQ for each item

34. Variations

34.1 The Employer shall have power to order the Contractor to do any or all of the following as considered necessary or advisable during the progress of the work by him

(a) Increase or decrease of any item of work included in the Bill of Quantities (BOQ);
(b) Omit any item of work;
(c) Change the character or quality or kind of any item of work;
(d) Change the levels, lines, positions and dimensions of any part of the work;
(e) Execute additional items of work of any kind necessary for the completion of the works; and
(f) Change in any specified sequence, methods or timing of construction of any part of the work.

34.2 The Contractor shall be bound to carry out the work in accordance with any instructions in this connection, which may be given to him in writing by the Employer and such alteration shall not vitiate or invalidate the contract.

34.3 Variations shall not be made by the Contractor without an order in writing by the Employer, provided that no order in writing shall be required for increase or decrease in the quantity of an item appearing in the BOQ so long as the work executed conforms to the approved drawings.

34.4 The Contractor shall promptly request in writing the Employer to confirm verbal orders and if no such confirmation is received within 15days of request, it shall be deemed to be an order in writing by the Employer.

35. Payments for Variations

35.1 Payment for increase in the quantities of an item in the BOQ up to 25% of that provided in the Bill of Quantities shall be made at the rates quoted by the Contractor.

35.2 For quantities in excess of 125% of the tendered quantity of an item as given in the BOQ, the Contractor shall be paid at the rate entered in or derived from in the Schedule of Rates (applicable for the area of the work and current at the time of award of contract) plus or minus the overall percentage of the original tendered rates over the current Schedule of Rates prevalent at the time of award of contract.

35.3 If there is no rate for the additional, substituted or altered item of the work in the BOQ, efforts would be made to derive the rates from those given in the BOQ or the Schedule of Rates (applicable for the area of the work and current at the time of award of contract) and if found feasible the payment would be made at the derived rate for the item plus or minus the overall percentage of the original tendered rates over the current Schedule of Rates prevalent at the time of award of contract

35.4 If the rates for additional, substituted or altered item of work cannot be determined either as at 35.1 or 35.2 or 35.3 above, the Contractor shall be requested to submit his quotation for the items supported by analysis of the rate or rates claimed, within 7 days.

35.5 If the Contractor's quotation is determined unreasonable, the Employer may order the Variation and make a change to the Contract Price which shall be based on Employer's own forecast of the effects of the Variation on the Contractor's costs.

35.6 If the Employer decides that the urgency of varying the work would prevent a quotation being given and considered without delaying the work, no quotation shall be given and the Variation shall be treated as a Compensation Event.

35.7 Under no circumstances the Contractor shall suspend the work on the plea of non-settlement of rates for items falling under this Clause.

36. Submission of bills for payment

36.1 The Contractor shall submit to the Employer monthly bills of the value of the work completed less the cumulative amount paid previously.

36.2 The Employer shall check the Contractor's bill and determine the value of the work executed which shall comprise of (i) value of the quantities of the items in the BOQ completed and (ii) valuation of Variations and Compensation Events.

36.3 The Employer may exclude any item paid in a previous bill or reduce the proportion of any item previously paid in the light of later information.

37. Payments

37.1 Payments shall be adjusted for deductions for advance payments, other recoveries in terms of the contract and taxes, at source, as applicable under the law. The Employer shall pay the Contractor the within **60 days** of submission of bill. The Contractor shall be liable to pay liquidated damages for shortfall in progress. For Progress beyond the agreed Programme, payment is subject to availability of the grants.

37.2 Items of the Works for which no rate or price has been entered in will not be paid for by the Employer and shall be deemed covered by other rates and prices in the Contract.

38. Compensation events

38.1 The following are Compensation events unless they are caused by the Contractor:

(a) The Employer does not give access to a part of the Site by the Site Possession Date stated in the Contract Data.
(b) The Employer orders a delay or does not issue drawings, specifications or instructions required for execution of works on time.
(c) The Employer instructs the Contractor to uncover or to carry out additional tests upon work which is then found to have no Defects.
(d) The Employer gives an instruction for dealing with an unforeseen condition, caused by the Employer, or additional work required for safety or other reasons.
(e) The effect on the Contractor of any of the Employer's Risks.

(f) The Employer unreasonably delays issuing a Certificate of Completion.
(g) Other Compensation Events listed in the Contract Data or mentioned in the Contract.

38.2 If a Compensation Event would cause additional cost or would prevent the work being completed before the Intended Completion Date, the Contract Price shall be increased and/or the Intended Completion Date is extended. The Employer shall decide whether and by how much the Contract Price shall be increased and whether and by how much the Intended Completion Date shall be extended.

38.3 As soon as information demonstrating the effect of each Compensation event upon the Contractor's forecast cost has been provided by the Contractor, it is to be assessed by the Employer and the Contract Price shall be adjusted accordingly. If the Contractor's forecast is deemed unreasonable, the Employer shall adjust the Contract Price based on Employer’s own forecast. The Employer will assume that the Contractor will react competently and promptly to the event.

38.4 The Contractor shall not be entitled to compensation to the extent that the Employer's interests are adversely affected by the Contractor not having given early warning or not having cooperated with the Employer.

39. Tax

39.1 Taxes, Duties and other Levies:

a) The selected bidder will be fully responsible for all applicable taxes, duties, license fees, etc. incurred in relation to the work. They must cover the taxes that may be imposed on their own personnel or any of their employees' earnings and will be expected to protect the employer from any potential claims made against them. The selected bidder must indemnify and hold the employer harmless against any such claims.

a) According to Commercial Tax Department Notification No.12/2017, all services are subject to a nil rate of GST under the definition of a pure service. The quoted rate should exclude the GST, which will be charged separately as per the prevailing applicable laws.

c) BWSSB does not assume any responsibility for taxes under the Indian Income Tax Act, 1961 for the selected bidder(s) or their personnel. In accordance with the provisions of the Indian Income Tax Act, 1961, if necessary, BWSSB will make deductions for Income Tax at source. The applicable tax at the prevailing rate will be included over and above the quoted price

If the Amount put to tender is exclusive of GST

GST and TDS Clause:

Prevailing GST:

The prevailing Goods and Services Tax (GST) rate is 18% as per the current taxation regulations. The GST amount is not included in the bid amount put forward by the bidder but will be applicable in addition to the awarded contract cost.

TDS Deduction:

As per the GST notification, a Tax Deducted at Source (TDS) of 2% shall be deducted by the client while making payments for the bills raised by the bidder.

Submission of Security Deposit:

Upon issuance of the Letter of Award (LOA) at the award cost, including GST, the successful bidder shall be required to submit the entire security deposit, comprising the applicable GST amount as well.

Invoicing and Tax Compliance:

The successful bidder shall adhere to all relevant GST regulations and guidelines while invoicing for the work contract. The invoice/bills provided by the bidder should clearly indicate the applicable GST rate, along with the tax registration details, and comply with all legal requirements as specified by the GST authorities.

Changes in GST Rate:

In the event of any change in the GST rate during the execution of the contract, the responsibility of updating the invoicing and pricing structure to reflect the revised GST rate shall lie with the bidder. The contract shall remain in force, and both parties shall abide by the new GST rate as per the applicable law.

GST Documentation:

The bidder is required to provide all necessary GST-related documentation, such as tax invoices, payment receipts, and any other documents requested by the contracting authority, in a timely and accurate manner.

Any disputes or issues related to GST:

In case of any disputes or issues related to GST compliance, the bidder shall be responsible for resolving such matters with the appropriate tax authorities. The contracting authority shall not bear any liability for any non-compliance or discrepancies related to GST.

This provision is an integral part of the bid document, and all bidders are requested to thoroughly review and acknowledge their understanding

and compliance with the prevailing GST rate of 18% before submitting their bids.

40. Price Adjustment:

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41. Liquidated damages

41.1 The Contractor shall pay liquidated damages to the Employer at the rate per day stated in the Contract Data for each day that the Completion Date is later than the Intended Completion Date (for the whole of the works or the milestone as stated in the Contract Data). The total amount of liquidated damages shall not exceed the amount defined in the Contract Data. The Employer may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages does not affect the Contractor's liabilities.

41.2 If the Intended Completion Date is extended after liquidated damages have been paid, the Employer shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment of bill.

42. DELETED

43. Securities:

43.1 The Security deposit (including additional security for unbalanced tenders) shall be provided to the Employer no later than the date specified in the Letter of Acceptance and shall be issued in an amount and form and type of instrument acceptable to the Employer. The Security deposit shall be valid until a date 30 days from the date of expiry of Defects Liability Period and the additional security for unbalanced tenders shall be valid until a date 30 days from the date of issue of the certificate of completion.

44. Cost of Repairs:

44.1 Loss or damage to the Works or Materials to be incorporated in the Works between the Start Date and the end of the Defects Correction periods shall be remedied by the Contractor at the Contractor's cost if the loss or damage arises from the Contractor's acts or omissions.

E. Finishing the Contract

45. Completion

45.1 The Contractor shall request the Employer to issue a Certificate of Completion of the Works and the Employer will do so upon deciding that the Work is completed.

46. Taking over

46.1 The Employer shall take over the Site and the Works within seven days of issuing a certificate of Completion.

47. Final account

47.1 The Contractor shall supply to the Employer a detailed account of the total amount that the Contractor considers payable under the Contract before the end of the Defects Liability Period. The Employer shall issue a Defect Liability Certificate and certify any final payment that is due to the Contractor within 90 days of receiving the Contractor's account if it is correct and complete. If it is not, the Employer shall issue within 90 days a schedule that states the scope of the corrections or additions that are necessary. If the Final Account is still unsatisfactory after it has been resubmitted, the Employer shall decide on the amount payable to the Contractor and make payment within 60 days of receiving the Contractor’s revised account.

48. As built drawings and /or Operating and Maintenance Manuals

48.1 If “as built”[1] Drawings and/or operating and maintenance manuals are required, the Contractor shall supply them by the dates stated in the Contract Data.

48.2 If the Contractor does not supply the Drawings by the dates stated in the Contract Data, or they do not receive the Employer’s approval, the Employer shall withhold the amount stated in the Contract Data from payments due to the Contractor.

49. Termination

49.1 The Employer may terminate the Contract if the other party causes a fundamental breach of the Contract.

49.2 Fundamental breaches of Contract include, but shall not be limited to the following:

(a) the Contractor stops work for 45 days when no stoppage of work is shown on the current Program and the stoppage has not been authorized by the Employer;

(b) the Employer instructs the Contractor to delay the progress of works and the instruction is not withdrawn within 60 days;

(c) The Contractor becomes bankrupt or goes into liquidation other than for a reconstruction or amalgamation;

(d) a payment due to the Contractor is not paid by the Employer within 90 days of the date of the submission of the bill by the Contractor.

(e) the Employer gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Employer;

(f) the Contractor does not maintain a security which is required;

[1] Completion Drawings

(g) the Contractor has delayed the completion of works by the number of days for which the maximum amount of liquidated damages can be paid as defined in the Contract data; and

(h) if the Contractor, in the judgment of the Employer has engaged in corrupt or fraudulent practices in competing for or in the executing the Contract. For the purpose of this paragraph : "corrupt practice" means the offering, giving, receiving or soliciting of anything of value to influence the action of a public official in the procurement process or in contract execution. "Fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Borrower, and includes collusive practice among Tenderers (prior to or after Tender submission) designed to establish Tender prices at artificial non-competitive levels and to deprive the Borrower of the benefits of free and open competition."

49.3 When either party to the Contract gives notice of a breach of contract to the Employer for a cause other than those listed under Sub Clause 49.2 above, the Employer shall decide whether the breach is fundamental or not.

49.4 Notwithstanding the above, the Employer may terminate the Contract for convenience.

49.5 If the Contract is terminated the Contractor shall stop work immediately, make the Site safe and secure and leave the Site as soon as reasonably possible.

50. Payment upon Termination

50.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Employer shall prepare bill for the value of the work done less advance payments received up to the date of the bill, less other recoveries due in terms of the contract, less taxes due to be deducted at source as per applicable law and less the percentage to apply to the work not completed as indicated in the Contract Data. Additional Liquidated Damages shall not apply. If the total amount due to the Employer exceeds any payment due to the Contractor the difference shall be a debt payable to the Employer.

50.2 If the Contract is terminated at the Employer's convenience or because of a fundamental breach of Contract by the Employer, the Employer shall prepare bill for the value of the work done, the reasonable cost of removal of Equipment, repatriation of the Contractor's personnel employed solely on the Works, and the Contractor's costs of protecting and securing the Works and less advance payments received up to the date of the certificate, less other recoveries due in terms of the contract, and less taxes due to be deducted at source as per applicable law and make payment accordingly.

51. Property

51.1 All materials on the Site, Plant, Equipment, Temporary Works and Works are deemed to be the property of the Employer, if the Contract is terminated because of a Contractor's default.

52. Release from performance

52.1 If the Contract is frustrated by any event entirely outside the control of either the Employer or the Contractor the Employer shall certify that the Contract has been frustrated. The Contractor shall make the Site safe and stop work as quickly as possible after receiving this certificate and shall be paid for all work carried out before receiving it and for any work carried out afterwards to which commitment was made.

53. Successful Bidder has to follow the SWD(Solid Waste Management Rules 2016) in this tender work.

F. Special Conditions of Contract

1. Labour :

The Contractor shall, unless otherwise provided in the Contract, make his own arrangements for the engagement of all staff and labour, local or other, and for their payment, housing, feeding and transport.

The Contractor shall, if required by the Employer, deliver to the Employer a return in detail, in such form and at such intervals as the Employer may prescribe, showing the staff and the numbers of the several classes of labour from time to time employed by the Contractor on the Site and such other information as the Employer may require.

2. Compliance with labour regulations:

During continuance of the contract, the Contractor and his sub contractors shall abide at all times by all existing labour enactments and rules made there under, regulations, notifications and bye laws of the State or Central Government or local authority and any other labour law (including rules), regulations, bye laws that may be passed or notification that may be issued under any labour law in future either by the State or the Central Government or the local authority. The Contractor shall keep the Employer indemnified in case any action is taken against the Employer by the competent authority on account of contravention of any of the provisions of any Act or rules made there under, regulations or notifications including amendments. If the Employer is caused to pay or reimburse, such amounts as may be necessary to cause or observe, or for non-observance of the provisions stipulated in the notifications/bye laws/Acts/Rules/regulations including amendments, if any, on the part of the Contractor, Employer shall have the right to deduct any money due to the Contractor including his amount of security deposit. The Employer shall also have right to recover from the Contractor any sum required or estimated to be required for making good the loss or damage suffered by the Employer.

The employees of the Contractor and the Sub-Contractor in no case shall be treated as the employees of the Employer at any point of time.

3. Protection of Environment:

The contractor shall take all reasonable steps to protect the environment on and off the Site and to avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or other causes arising as a consequence of his methods of operation. During continuance of the contract, the contractor and his sub-contractors shall abide at all times by all existing enactments on environmental protection and rules made there under, regulations, notifications and bye-laws of the State or Central Government, or local authorities and any other law, bye-law, regulations that may be passed or notification that may be issued in this respect in future by the State or Central Government or the local authority.

4. Arbitration (Clause 24)

4.1 The procedure for arbitration shall be as follows:

(a) In case of dispute or difference arising between the Employer and the Contractor relating to any matter arising out of or connected with this agreement it shall be settled in accordance with the Arbitration and Conciliation Act 1996. The disputes or differences shall be referred to a Sole Arbitrator. The Sole Arbitrator shall be appointed by agreement between the parties; failing such agreement, by the Appointing Authority (any one of the Organizations as per list enclosed in Annexure)

(b) Arbitration proceedings shall be held at ***Bangalore***, Karnataka, India

(c) The cost and expenses of arbitration proceedings will be paid as determined by the Arbitrator. However the expenses incurred by each party in connection with the preparation, presentation, etc., shall be borne by each party itself.

(d) Performance under the contract shall continue during the arbitration proceedings and payments due the Contractor by the Employer shall not be withheld, unless they are the subject matter of the arbitration proceedings.

5 Contractor to Co-ordinate his Work with Other Contractors

5.1 The Contractor has to co-ordinate with the other concerned Contractors as already specified in Conditions of Contract for all such works as per the directions of Engineer in charge at no extra cost.

6 **Continuation of Work:**

6.1 In case of the death of a contractor after executing the agreement / commencement of the work, his legal heir, if any eligible registered contractor and willing, can execute and complete the work at the accepted tender rates irrespective of the cost of the work

7. Successful Bidder has to follow the SWD(Solid Waste Management Rules 2016) in this tender work.

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Sd/-

Chief Engineer (Waste Water Management-East

SECTION 6:
CONTRACT DATA

Items marked "N/A" do not apply in this Contract.

The following documents are also part of the Contract:

- The Schedule of Operating and Maintenance Manuals
- The Methodology and Program of Construction
- Site Investigation Reports
- The Schedule of Key and Critical Equipment to be deployed on the work as per agreed program of construction.

The Employer is :

Name: Bangalore Water Supply and Sewerage Board represented by **Chief Engineer (Waste Water Management-East)**

Address: Bangalore Water Supply & Sewerage Board
5th Floor, Cauvery Bhavan D-Block,
K.G. Road, Bangalore 560009

Name of authorized Representative: Executive Engineer (WWM-STP-K&T V)
BWSSB Kadabeesanahalli STP outer ring road
Marathalli,
Bangalore 560037

The name and identification number of the Contract is : **Various Improvement Works taken up under Jal Hi Amrut scheme at 02 MLD Ulsoor STP coming under EE(WWM-STP)K&T Division CALL-2**

The start date shall be the date of issue of notice to proceed with the work.

The Intended Completion Date for the whole of the Works is **06 Months**

Milestone Dates:

	Physical works to be completed	Period from the date of issue of notice to proceed with the work
Milestone 1	100% completion of work in all respects as per the scope of work	0-6 months

	awarded in the contract.	

The Site possession date is the day of issue of notice to proceed with the work

The Site location is defined in drawing.

The Defects Liability Period is 365 days.

Insurance requirements are as under:

Type of Cover		Minimum Cover for Insurance
(i)	Works , Plant and materials	The sum stated in the Agreement plus 20%
(ii)	Loss or damage to equipment	Full replacement cost
(iii)	Loss or damage to property of Third Party	Full replacement cost
(iv)	Personal injury or death insurance (a) for Third Party	Rs. 20.00 Lakh
	(b) for Contractor's employees or labour	In accordance with the statutory requirements applicable to Karnataka

Price Adjustment Formula;

[40]

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The liquidated damages for the whole of the works are Rs. ***0.1%*** per day of the contract value and that for the milestones are as under:

The maximum amount of liquidated damages for the whole of the works is ***ten*** percent of final contract price.

The date by which "as-built" drawings (in scale **1:200**) in 2 sets are required is within 30 days of issue of certificate of completion of Whole or Section of the Work as the case may be.

The amount to be withheld for failing to supply "as the date required is Rs.1,00,000-00

The following events shall also be fundamental breach of the contract :

1. The contractor has contravened Sub-clause 7.1 and Clause 9 of CC.

The percentage to apply to the value of the work not completed representing the Employer's additional cost for completing the Works shall be ***30*** percent.

Sd/-

Chief Engineer

(Waste Water Management-East)

SECTION 7:

TECHNICAL SPECIFICATIONS

7.1 Mechanical Coarse Bar Screen-TSPS & ISPS

General

(a) The screen shall be installed in raw sewage inlet channel, and the screen shall be of the front raking type. Inclined Bar screen at 75 degree and the minimum bar thickness shall be 16 mm x 20 mm with 50 mm width of the bar.

(b) The screen shall be capable of performing the duties set out in this Specification. All the materials and sub-assemblies used shall be suitable for outdoor application. They shall be constructed to minimize maintenance requirements.

(c) Ideally, any moving parts such as sprocket, bearings, etc. should not be in immersed in sewage. In case immersed, the parts shall be of such materials that require little or no maintenance. All lubricating points shall be conveniently accessible from the deck level.

(d) The screen shall be suitable for discharging 75% of the screened material lifted from the screen into the chute.

(e) The screen shall be designed such that in case of heavy accumulation of solids, the same is to be removed gradually without overloading or damaging the screen bars or mechanism.

Frame work

The framework of the screen shall be of robust construction with intermediate cross-bracing. The lower ends and sides of the frame shall be grouted in concrete. Each screen shall have an independent canopy at the top for weather protection. Framework of screen shall be constructed of Grade 316 stainless steel and cross section with a

minimum thickness 6 mm. Various parts fastened by welding or bolting shall be braced as necessary to ensure a rigid structure. The side frames shall be minimum 6 mm formed to a channel profile. The bottom thickness shall be minimum 6 mm. The frame shall have support beams with U or C-profile minimum thickness of 6 mm on the front above the maximum water line. The Screen Frame shall be supplied in one piece, requiring no field assembly. Bars shall be supported from framework.

7.1.2 Screen bar assembly

Screen bar assembly shall be fitted across the screen chamber. Screen shall have a series of vertically oriented bars spanning the inlet channel and spaced as specified. Bars shall be sufficiently rigid to prevent vibrations in stream-wise and lateral modes and to withstand the maximum differential head that will occur with the screen totally blinded. Bars shall have tapered cross section to prevent jamming of screenings between bars. Bars shall have supports only at both ends.

Rake carriage

The design shall be multi rake and the rake carriages shall comprise a stiffened frame work to which is attached replaceable rake tines. Rake carriage shall incorporate suitable devices to enable the rake to ride over any small obstacles wedged in the screen and automatically stop the drive motor in the event of the rake jamming against a large obstruction. There shall be no mechanical damage resulting from obstructions wedged in the screen bars. The rake carriage shall always come to rest in a parked position with the rake above the sewage level. The raking tines shall have the tooth profile precision cut from a single continuous bar of enough thickness and depth to ensure adequate stiffness and strength to cope with the specified duty cycle. The rakes shall run in guides on both sides to ensure engagement and clean the bars from the upstream side of the screen. The rakes shall be fabricated from stainless steel Grade 316L. The rake material,

thickness of material, and capacity of the rake are similar to the entire construction. The rake tines shall be suitable to accommodate bulky screenings.

Thickness of rake blade 10mm

Reinforcement profile 6 mm

Rake Side Plates 6mm

The screen shall be cleaned automatically through an adjustable timer. The rake lowered will clear screen bars at the beginning of a cycle and accurately engage with the screen bars at the bottom of the channel. The tine profile and rake motion shall be designed to elevate screenings to the discharge chute at deck level, ensuring they do not wrap around the tines or the stationary bars, and also prevent them from falling back into the sewage flow during the cleaning cycle. The rake shall be suitable for elevating debris encountered at any level. Rake tines shall be replaceable.

Screenings transported to the top of the screen shall be discharged positively by means of a scraper mechanism to the discharge chute leading to a screw conveyor system. A scraper blade made of a combination of synthetic and other material shall be provided on the scraper. The rake tines shall then be retracted, and the unit shall be ready for the next cycle. Drive chains, chain guides, chain sprockets, bearings, and axles shall be fully replaceable without having to remove the screen from the channel.

Rake Lifting Mechanism

Lifting Mechanism Chains shall be roller type chains and made of SS 316L and SS 316 sprocket of high tensile strength and resistance to corrosion. The maximum each chain take-up is 112,000 Newton. Chain Pins shall be a Stainless Steel and hardened.

Chain guide shall be securely fixed to the Screen frame for the full height of travel and shall not protrude into the flow. The type of chain guide, thickness of material and size is an L-Profile, Material Grade 316 Stainless Steel. Upper Bearings shall be of UCF Type or equal; housed bearings are grease-lubricated, mounted the Take-Up Frame assembly. No Bearings shall be submerged in the waste stream.

Inspection Platforms

An inspection platform shall be provided for periodic checking and maintenance of the drive and other critical parts. A ladder with handrails for access to this platform shall be fixed. Suitable hand rails shall be provided for safety on the inspection platform and also at deck level. The platform shall have holes to prevent rain water accumulation.

Dead plate

A SS316L dead plate extending from the top of the bars to the deck level shall be provided to ensure that screenings do not fall back. Dead plate shall be made of minimum 6 mm thick plate. The clearance between the tines and the dead plate shall not exceed 6 mm.

Discharge Chute

A discharge chute shall be of minimum 3mm thick provided for each screen to divert screenings discharged from the screen to a conveyor mechanism. The discharge chute shall be made of SS 316. The discharge chute shall be mounted at an angle of minimum 30 degrees. Panels are positioned on both sides to protect from splashing.

Covers

Covers which are easily removable shall be provided for easy maintenance. Covers shall be constructed of clear impact-resistant Polycarbonate material thickness 6 mm and SS 316 thickness is 2 mm to allow for visual observation during screen operation.

Driving Mechanism

The driving mechanism shall consist of a sturdy reduction gear unit driven through multiple 'V' belts or directly by an electric motor. Motor shall be mounted in such a way that the tension of the 'V' belts can be adjusted. A manually reset torque limiter shall be provided between the motor and gear unit, incorporating a limit switch to cut off the supply to motors in the event of an overload. The drive mechanism for the rakes shall incorporate a solid shaft constructed of SS 316.

Installation

The screen shall be designed for installing to (a) pivot out of the channel, (b) be pulled out of the channel. Non-metallic side flaps seal the screen to the channel walls, or (c) The Screen shall be grouted in a wall recess and/or floor recess.

Gear Reducer

(a) The reducer shall be sized and selected with a minimum service factor of 2.0 times the motor horsepower rating in accordance

with applicable American Gear Manufacturer's Association Standards. The reducer shall have a life of 40,000 hours based on the motor horse-power. The reducer shall have an efficiency of not less than 90% based on reducer input.

(b) All gear meshes shall be oil lubricated. All gears shall be provided with an oil reservoir for instant lubrication on starting. The gear reducer housing shall be provided with an oil level indicator and an oil drain with necessary fittings.

(c) The gear reducer shall be of cast iron construction. The reducer housing shall also include suitable lifting lugs and external gear train inspection covers for each gear train. The gears shall be matched for maximum tolerance variation. The gear reducer shall be suitable to reduce the motor asynchronous speed to achieve the required speed of raking.

Control System

(a) The screening operation shall be carried out through adjustable timers which are adjustable at site for 0-60 minutes interval between two operations.

(b) Control system for the conveyor shall be designed to achieve the following:

(i) Conveyor shall be started when any of the rakes starts its upwards travel.

(ii) Conveyor shall be stopped with a time delay (by adjustable timer) after rake is stopped.

(c) Weatherproof, lockable, emergency mushroom headed stop push buttons shall be provided near each motor for screen and screw conveyor, operation of stop push button, and overload prevention for screen and screw conveyor shall be included in the control scheme.

Screw Conveyor with compactor

Technical specifications of Screening Conveyor

The Screening Conveyor shall be Shaft Screw Conveyor and applied for conveying the floating debris to the next facilities. The screening system shall be supplied with a shaft screw conveyor that will be used to convey the screenings to the automatic screenings press and discharge system that compacts, dewaters and discharges the screenings through a chute to the screenings storage system.

Dumping of the screenings to the duty/standby conveyor opening shall be with the automatic deflection plate, which shall be positioned towards the conveyor that is selected from the LCP/SCADA for the duty and automatically towards the standby if the duty conveyor trips. Position of this deflection plate shall be interfaced with PLC.

Screening wash compactor shall be suitable for washing and compacting the floating waste coming out of the duty and standby shaft screw conveyor in case of multiple screens, or directly from the screen in case of single screen installed in municipal waste water pumping station or treatment plant.

Shaft screw conveyor shall be made of stainless steel of grade SS 316 and shall incorporate shaft spirals. Cover plates for shaft screw conveyors shall be provided along the entire conveyor length to contain splatter. Conveyor trough covers shall be made from 5 mm of specified grade of stainless steel single piece formed sheet metal, not greater than 1000 mm in length, attached to the screw conveyor

trough using toggle clamps. The cover shall also be of sufficiently tight fit to prevent the conveyed media from leaking out of the conveyors. A minimum 2.5 mm neoprene gasket of 50 durometer shall be applied with an appropriate adhesive to the mating surfaces of the trough covers.

Its structure shall have excellent durability for continuous operation over a long time. It shall be abrasion, corrosion and vibration resistance. It should have a structure that is free from debris material clogging.

The spiral flighting for the shaft screw conveyors shall be designed to convey material without a center shaft. The spiral flights shall be designed to ensure stability, preventing distortion and jumping in the trough while operating at the design speed and capacity. The spiral flighting shall be Stainless steel of grade SS 316.

The shaft conveyor trough liner material shall be an ultra-high molecular weight (UHMW) polyethylene with a minimum thickness of 12 mm. There shall be two colored layers in the liner material to indicate wear. The liner shall extend the full length of the trough, covering the entire semicircular bottom portion of the trough. The liner shall be secured at intervals not to exceed 1000 mm, using specified stainless steel retaining clips of an approved design.

Screening wash compactor shall be made of stainless steel of grade SS 316. The wash compactor will receive the waste through the inlet hopper, and the waste shall be dropped into the conveying zone of the compactor's main body.

Screw and liner shall have rigid thickness for resisting corrosion and abrasion caused during carrying of debris. Its structure shall be designed not to invite biting and clogging. Casing shall be equipped with an inspection port for cleaning convenience. The driving device

shall have an overload limiting switch to avoid a broken situation caused by overloading.

The conveying zone shall have perforations at the bottom so that the water coming along with the wet screening is dropped in to the dewatering trough. The dewatering trough will have a set of nozzles positioned upwards so that the screening particles clogging the perforations will be removed by the force of spray water. The construction of the dewatering trough shall be inclined towards the drive end so as to enable the flow of water to the drain hole provided with an elbow connection. The compactor main body shall also have a drain hole with an elbow connection.

In the conveying zone there shall not be any impeller wheel or any other mechanical breaking device. The breaking up of organic matter shall be done solely by water through an assembly of nozzles connected with solenoid valves in a special washing zone between the conveying and the compaction zone. The screening shall move towards the compaction zone by a shafted screw of a constant pitch connected to a drive shaft. This drive shaft shall be connected to the drive unit through axial and radial bearings.

An elephant trunk shape outlet tube shall be connected to the compactor body with a flanged connection. An elbow shall be provided at the flanged connection to carry the washed screening in the reduction tube. The reduction tube shall be divergent to ease the push of the washed screening upward in to the outlet tube. The end of the reduction tube shall have an elbow with a discharge plate/chute to enable the collection of the screenings in bagging units or a container.

The Screening wash compactor shall remove the organic material by washing and compaction thus reducing the volume and weight by 50%.

The main body of Screening wash compactor shall have a material thickness of minimum 3 mm and the bottom of the compactor main body shall be perforated with 5 mm holes.

The screw flights of wash compactor shall have a minimum thickness of 12 mm and at the end of compaction zone, there shall be wear bars of 10 mm thickness bolted to the wash press main body/tube for easy replacement.

The elephant trunk shaped outlet tube shall be diverging to prevent the waste getting clogged. The connection of the outlet tube to the main body shall be flanged type. All the bend fittings (elbows) in the outlet tube shall be long radius design.

Frequency Inverter shall be provided for Forward-reverse-forward motion of the screw and as overload protection device.

The gearbox of screw conveyor and wash compactor shall be hollow shaft, parallel helical gear unit have a minimum service factor of 1.2, oil bath lubricated with oil sealing. The motor shall be of TEFC type with minimum IP 55 protection & Class F insulation and be suitable for operation on 3 phase, 415V and frequency of 50 Hz. The drive shaft must be precisely machined and shall have radial and axial bearings.

The common control panel shall have IP 55 protection, painted with epoxy paint and shall comprise of:

- Mushroom head emergency stop.
- Overload relays for motor protection.
- Circuitry to operate the Screening conveyor and wash compactor with a signal for start command from the screen motor start and a delay-timer-based stop command after the screen motor stops.

- Selector switch to operate the Screening conveyor and wash compactor in Auto, manual and remote mode.
- Provision for suitable PLC circuitry shall be provided in case requirement of connectivity with SCADA system.

The Screw conveyor and wash compactor shall be supplied factory assembled and duly tested at manufacturer's works before dispatch. Upon receipt at site these shall be installed resting on the channel floor and mechanically or chemically anchored on to the platform in a way that there are minimum chances of misalignment.

Material of Construction

Screw	SS 316
Screw trough	SS 316
Screw cover	SS 316
Liner	Ultra-High Molecular Polyethylene (UHMPE)

Accessories

Anchor bolts and nuts	1 set
Special tools	1 set
Flexible joint for inlet and outlet	1 set
Liner (for spare)	1 set

Portable Screenings Container

Portable screenings containers made of galvanized steel shall be provided to store the screenings until time of pick up. Minimum two

Screenings Containers shall be provided at the screening chamber. The container shall have capacity of approximate 2.0 cum and shall be of a convenient height to permit the discharge of screenings directly into the container without having to transfer the screenings manually. The containers shall have hinged covers and their design shall permit their being lifted by an overhead hoist or packer truck. The container will have four wheels each of minimum 40 cm diameter, Tyre type. The maximum height of container including wheels shall be 66 cms. The sides shall be constructed of 12-gauge steel. The bottom of the container shall be made of 5 mm plate steel. The containers shall be reinforced with 50 mm x 50 mm x 5 mm angle.

Automatic Jam removal system

The screen shall have automatic electronically controlled Jam removal facility to ensure smooth operation without damaging the main equipment.

Motors

Motors shall be squirrel cage type conforming to IS 325. The Drive Motor shall be controlled by a Full Voltage Reversing Motor Contactor mounted on a Back Panel to be mounted in an Enclosure or MCC (Motor Control Center) in the main Panel. The power rating of motor shall be at least 125% of maximum power requirement. The other features of motors shall be as follows:

(i) Type of duty : Intermittent (S4)/ Continuous (S1) based on manufacturer's design

(ii) Method of Starting : DOL

(iii) Class of insulation : F (Temperature rise limited to class B)

(iii) Type of enclosure : TEFC

(iv) Degree of protection : IP 55

(a) The material of construction of Mechanical Raked Screen shall be as follows :

S. No.	Component	Material
(i)	Screen	Stainless steel SS316L
(ii)	Frame (Side and Bottom Portion)	Stainless steel SS316
(iii)	Raked tines	Stainless steel SS316L
(iv)	Fasteners including Anchor bolts	Stainless Steel : 316
(v)	Screen canopy	Stainless Steel: SS316L
(vi)	Chutes	SS316

Mechanical Fine Screen-WWTP Inlet

General

The mechanically operated self-cleaning fine screening equipment used to collect the fine sized floating solid from travelling in the screen channels before entering to Grit chamber.

Working Principle

The Raw sewage entering the fine screen channel which contains the solids flowing with the sewage while gets retained on the face of the perforated panels of screen, the water passes through. The Screens comprise of screen frame of rugged construction, Screen elements,

discharge chute, set of high-pressure nozzles, a pair of chain and sprockets and high efficiency drive unit. As the endless perforated band of screen elements escalates upward, they carry the deposited waste along with it till the waste reaches to the top of screen. At the turning point where the screen element is about to start its downward journey, solid are dislodged from the filer elements by a series of high-pressure water jets nozzles. The solid will fall on to the in-built chute. From the chute the waste can either be collected into a Screw conveyor for separation of waste and wash water and for further disposal. Screen shall be adopted with cleaning mechanism either brushes with motor drive or water spray bar mechanism.

These fine Screen operates by means of level and clogged condition as detected by a level sensor indication in the screen channel,

(i)The screen shall start when raw sewage level reaches maximum water level, screen will operate till water level achieves minimum water level.

(ii) The screen will operate once clogging indication is detected by level sensor through by means of PLC unit of the screens.

Construction features:

A. Frame work

The framework of the screen shall be of robust construction with intermediate cross bracing. The lower ends and sides of the frame shall be grouted or anchored in channel. Each screen shall have an independent canopy at the top for weather protection. Framework of screen shall be constructed of Grade 316 stainless steel and cross section with a minimum thickness 5 mm. Various parts fastened by welding or bolting shall be braced as necessary to insure a rigid structure. The side frames shall be minimum 5 mm formed to a channel profile. The bottom thickness shall be minimum 5 mm. The frame shall have support beams with U or C-profile minimum thickness of 5 mm on the front above the maximum water line. The Screen Frame shall be supplied in one piece, requiring no field assembly. Mesh / Perforated punched plate hole shall be supported from framework.

B. Screen Assembly

The screen shall be provided with a spray nozzles bar or rotating brush (as per design). The screen panels are made of step-type perforated plates covering the entire width of the screen field and are linked to a continuous chain and sprockets forming an endless band.

Step type perforated plate profile can carry large sized solids and avoids formation of clogging. Use of high-pressure nozzle spray system. Primary system above discharge level ejecting entrapped screenings and secondary wash system bringing any remaining residue through drainpipe back in to upstream of the channel. Heavy duty sprockets and chains made of stainless steel and chain pin made of hardened stainless-steel material of special grade. Special grade ceramic bushes with self-lubricating type shall be provided in lower sprockets to ensure very long operative life. Self carrying design its own weight is sufficient to keep the screen securely in position.

The mesh/Perforated punched plate is a combination of bar/ hole along with hook like profile or step type L- profile for carrying the screening, everything connected and assembled through interlocks of SS316L material, to avoid too much head loss through the mesh is optimized.

Screen frames are heavy-duty duty made in SS316L and 5 mm thickness, horizontal tubular pipes are mounted inside frame and assembled properly.

The cleaning brush will be located in solid discharge, will be circular, and Brush hair shall be made of high-quality material with UV and chemical-resistant bristles and Neoprene or Polyurethane blades, cleaning system are activated by helicoidally gearbox with direct transmission, brush will be working always when screen is in working, alternatively a spray nozzle bars can also be given for cleaning of perforated panel on the discharge of screen in place of rotating brush.

C. Inspection Platforms

An inspection platform shall be provided for periodic checking and maintenance of the drive and other critical parts. A ladder with handrails for access to this platform shall be fixed. Suitable handrails shall be provided for safety on the inspection platform and also at deck level. The platform shall have holes to prevent rainwater accumulation.

D. Discharge Chute

A discharge chute shall be of minimum 4 mm thick provided for each screen to divert screenings discharged from the screen to a conveyor mechanism. The discharge chute shall be made of SS 316. The discharge chute shall be mounted at an angle of minimum 30 degrees. Panels are positioned on both sides to protect from splashing. Screenings are delivered down an enclosed chute. Two nos. Screening containers (wheeled) of suitable capacity shall be supplied with the screens.

E. Covers

Covers which are easily removable shall be provided for easy maintenance. Covers shall be constructed of clear impact-resistant Polycarbonate material thickness 6 mm and SS 316 thickness is 2 mm to allow for visual observation during screen operation.

F. Driving Mechanism

The driving mechanism shall consist of a sturdy reduction gear unit driven directly by an electric motor. A manually reset torque limiter shall be provided between the motor and gear unit, incorporating a limit switch to cut off the supply to motors in the event of an overload. The drive mechanism for the shall incorporate a solid shaft constructed of SS 316. The drive to the main shaft shall be TEFC

weatherproof IP55 motor fitted with an anti-condensation heater. The motor shall be flanged to a shaft-mounted gear unit giving the final output speed. This shall produce a linear speed for the screen panels of about 3 m/min. The drive shall be protected from mechanical overload by an electrical current sensing device in the screen control panel. Suitable conveyer arrangement shall be provided to transfer the screenings to the nearest container/trailer. A spray system shall be provided to backwash the screen panels and to help in cleaning the screenings. Water / treated sewage shall be used for back wash purpose.

Installation

The screen shall be designed for installation to either (a) pivot out of the channel, (b) be pulled out of the channel. Non-metallic side flaps seal the screen to the channel walls, or (c) The Screen shall be grouted in a wall recess and/or floor recess. Minimum 600 mm access clearances between the screens shall be provided. And screens shall be designed in such way that minimal tools shall be used removal of screen Panels and covers during maintenance. The contractor shall maintain minimum spares parts such as brushes, nozzles, chain links and sensors.

Surface Finishing:

Stainless steel components shall be fabrication and then pickled and passivated on all surfaces to remove any ferrous contamination taking place during the process of welding, cutting, machining, and handling.

Gear Reducer

(a) The reducer shall be sized and selected with a minimum service factor of 2.0 times the motor nameplate horsepower rating in accordance with applicable American Gear Manufacturer's Association Standards. The reducer shall have a life of 40,000 hours based on the motor name plate horse-power. The reducer shall have an efficiency of not less than 90% based on reducer input.

(b) All gear meshes shall be oil lubricated. All gears shall be provided with an oil reservoir for instant lubrication on starting. The gear reducer housing shall be provided with an oil level indicator and oil drain with necessary fittings.

(c) The gear reducer shall be of cast iron construction. The reducer housing shall also include suitable lifting lugs and external gear train inspection covers for each gear train. The gears shall be matched for maximum tolerance variation. The gear reducer shall be suitable to reduce the motor asynchronous speed to achieve the required speed of raking.

Control System

(a) The screening operation shall be carried out through adjustable timers which are adjustable at site for 0-60 minutes for interval between the two operations (Screens & Conveyor).

(b) Control system for the conveyor shall be designed to achieve the following:

(i) Conveyor shall be started when any of the rakes starts its upwards travel.

(ii) Conveyor shall be stopped with a time delay (by adjustable timer) after rake is stopped.

(c) Weatherproof, lockable, emergency mushroom headed stop push buttons shall be provided near each motor for screen and screw conveyor Operation of stop push button, and overload

prevention for screen and screw conveyor shall be included in the control scheme.

(d) The panel should be made of Stainless steel SS316 with IP-55 protection and comprise of Mushroom Head Emergency stop switch, Overload relays for motor protection, MCB's, HRC Fuses, Control circuitry to operate the screen with Differential radar type level sensors Selector Switch to operate the screen on clogging mode and this entire screen & conveyer system shall be operated in fully automatic modes of operation. Screen cleaning trigger shall be provided for every minimum 30 minutes even if no clog is detected to prevent biofouling. Also, the Alarms (Trip, Torque, motor overload & high, Low-water Level sensing etc..) as applicable shall be populated as Alarms to the Operator for further intervention ir-respective of any mode of operation.

(e) Variable Frequency Drive should be provided with panel.

Technical particular and MOC are listed in the table below:

Si.no.	**Technical Description**	**Data**
1.	Perforation size of screen Step/ Mesh or Plate	4 mm (maximum)
2.	Screen Mesh or Plate thickness	4 mm
3.	Top, Bottom & Side Plates	Minimum 5 mm thick
4.	Discharge chute	Minimum 4 mm thick
5.	Angle of Inclination	65 to 75 degree
	Material of construction	

Si.no.	Technical Description	Data
a.	Screen Filter step/Mesh or Plate	Stainless Steel ASTM A 240, Grade 316L
b.	Screen Frame (Top, Bottom, Adjacent Sides and Dead Plates)	Stainless Steel ASTM A 240, Grade 316
c.	Drive Chain & Sprocket	Stainless Steel ASTM A 240, Grade 316L/ Duplex Stainless Steel SAF 2205
d.	Drive Shaft	Stainless Steel ASTM A 276, Grade 316
e.	All Fasteners and Anchor Bolts	Stainless Steel, Grade 316
f.	Discharge chute	Stainless Steel ASTM A 240, Grade 316
g.	Spray bars & jet nozzles	Stainless Steel ASTM A 240, Grade 316L
h.	Dewatering tube	Stainless Steel ASTM A 240, Grade 316L

Controls And Instrumentation

A. General

i) Fine Screens

Sewage flow shall enter the inlet common channel of fine screens. The high-level in this channel shall initiate a screen cleaning cycle, and both the “Low” and “high-high” level shall generate an alarm.

The fine screens shall be operable manually by using Auto / Manual position control switch from a local control panel located adjacent to the equipment or remotely from the WwTP SCADA / HMI. Remote operation shall be operator selectable as manual or auto. In auto mode, operation of the screen rake mechanism shall be controlled by level differential with a timer override. Radar Type Level Sensors shall be installed both upstream and downstream of the screens. When the upstream minus downstream level differential reaches an operator specified maximum, a screen cleaning cycle shall be initiated. Alternatively, the operator may also specify a maximum interval between cleaning cycles (as Timer Setpoints configurable). If this interval elapses without cleaning, a cleaning cycle shall be initiated regardless of level differential. The speed of Screen drives shall be synchronized automatically by using VFDs during any clog situation to retain back to the original position with minimum number of iterations otherwise those drives shall be tripped automatically for further manual interventions. The upstream and downstream levels shall be continuously monitored by differential level measuring systems.

Alarms/faults and status shall be monitored/logged, and control commands shall be generated in accordance with the Engineer-approved I/O list (As per Typical Drive Control Philosophy table in Part-13).

ii) Screening Conveyer

The screening conveyer shall operate in Auto mode in linkage with the Fine screens. The screening conveyer can be operated manually by the operator at a local control panel located adjacent to the equipment for trouble shooting or maintenance, or at the WwTP SCADA / HMI.

Alarms/faults and status shall be monitored/logged, and control commands shall be generated in accordance with the Engineer-approved I/O list (As per Typical Drive Control Philosophy table in Part-13).

The entre screen & conveyer system shall be operated in fully automatic operational requirement. The conveyor drive trips when all screen drives under trip mode otherwise conveyor drive operation shall be continuously in Run mode. The Screen Control Panel embedded with internal wiring stand-alone PLC & 10 inches panel

mounted touch screen HMI system which includes Potential free contacts / Terminal Blocks / Selector Position Control switches (Manual / Auto) and also entire Screen PLC / HMI data (Feedbacks & Command signals including Alarms) shall be interfaced with WwTP PLC / SCADA system by using hard wired communication system (Compatible protocol in line with WwTP PLC / SCADA System) for the purpose of continuous monitoring and control operations. For more details, please refer SCADA CONTROL SYTEM ARCHITECTURE DRAWING in Volume-4 of the tender document.

The control system shall be provided by the screen supplier.

B. LOCAL CONTROLS (PER SCREEN)

1. One (1) National Electrical Manufacturers Association (NEMA 7, 4-hole, Class 1 Division 1) approved Cast Aluminium local control station.

C. CONTROL PANEL

1. Manufacturer shall provide control panel with a lockable NEMA 4X corrosion-resistant stainless-steel enclosure for free standing. Contractor shall install the control panel and provide wiring.
2. Control panel shall contain all power and control devices necessary for the proper function of the screen and shall include the following:

a. 600-Volt rated main circuit breaker disconnect with lockable handle

b. 480 – 120 Volt control power transformer

c. VFD and Circuit Breaker Branch Circuit Protection for main screen drive motor

d. VFD and Circuit Breaker Branch Circuit Protection for screen cleaning brush motor

e. Control Panel ON-OFF selector switch

f. MANUAL-OFF-AUTO selector switch for the operation of the screen drive

g. 3-pole reversing contactors with screw clamp terminals, motor protection relays and all other necessary equipment for screen motor and brush motor protection

h. “Screen Drive On” indication

i. “Brush Drive On” Indication

j. “Wash Water On” Indication

k. “Screen Motor Fault” indication

l. “High Water Level” indication

m. “Control Power” indication

n. Alarm silence and reset push buttons

o. Spare contact for remote indication of “Screen Motor Fault” alarm

p. Spare contact for remote indication of “High Water Level” alarm

q. Spare contact for remote indication of “Control Power Failure” alarm

r. Control relays, wiring and circuitry required to implement the control logic

s. Programmable controller (PLC) & Operator Interface (i.e. Panel mounted 10 inches touch screen HMI) makes shall be followed as per approved make list of PLC / Instrumentation in Part-13.

t. “Emergency-Stop Operated: pop-up with Alarm Indication

Screw Conveyor with compactor

(a) Technical specifications of Screening Conveyor

The Screening Conveyor shall be Shaft Screw Conveyor and applied for conveying the floating debris to the next facilities. The screening system shall be supplied with a shaft screw conveyor that will be used to convey the screenings to the automatic screenings press and discharge system that compacts, dewaters and discharges the screenings through a chute to the screenings storage system.

Dumping of the screenings on to the duty/standby conveyor opening shall be with the automatic deflection plate, which shall be positioned towards the conveyor which is selected from the LCP/SCADA for the duty and automatically towards the standby if duty conveyor trips. Position of this deflection plate shall be interfaced with PLC.

Screening wash compactor shall be suitable for washing and compacting the floating waste coming out of the duty and standby shaft screw conveyor in case of multiple screens, or directly from the screen in case of single screen installed in municipal waste water pumping station or treatment plant.

Shaft screw conveyor shall be made of stainless steel of grade SS 316 and shall incorporate shaft spirals. Cover plates for shaft screw conveyors shall be provided along the entire conveyor length to contain splatter. Conveyor trough covers shall be made from 5 mm of specified grade of stainless steel single piece formed sheet metal, not greater than 1000 mm in length, attached to the screw conveyor trough using toggle clamps. The cover shall also be of sufficiently tight fit to prevent the conveyed media from leaking out of the conveyors. A minimum 2.5 mm neoprene gasket of 50 durometer shall be applied with an appropriate adhesive to the mating surfaces of the trough covers.

Its structure shall have excellent durability to continuous running for long time. It shall be well taken into account of abrasion resistance, corrosion and vibration resistance. It should have a structure which is free from debris material clogging.

The spiral flighting for the shaft less screw conveyors shall be designed to convey material without a center shaft. The spiral flights shall be designed with stability to prevent distortion and jumping in the trough while operating at design speed and design capacity. The spiral flighting shall be Stainless steel of grade SS 316.

Shaft conveyor trough liner material shall be an ultra-high molecular (UHMW) polyethylene with a minimum 12 mm thickness. There shall be two colored layers in the liner material to indicate wear. The liner shall extend the full length of the trough, covering the entire semicircular bottom portion of the trough. The liner shall be secured at intervals not to exceed 1000 mm, using specified stainless steel retaining clips of an approved design.

Screening wash compactor shall be made of stainless steel of grade SS 316. The wash compactor will receive the waste through inlet hopper and the waste shall get dropped in to the conveying zone of the compactor main body.

Screw and liner shall have rigid thickness for resisting corrosion and abrasion caused during carrying of debris. Its structure shall be designed not to invite biting and clogging. Casing shall be equipped with inspection port to the necessity as well as for cleaning convenience. Driving device shall have overload limiting switch for avoiding broken situation caused by overloading.

The conveying zone shall have perforations at the bottom so that the water coming along with the wet screening is dropped into the dewatering trough. The dewatering trough will have a set of nozzles positioned upwards so that the screening particles chocking the perforations will be removed by the force of spray water. The construction of the dewatering trough shall be inclined towards the drive end so as to enable the flow of water to the drain hole provided

with an elbow connection. The compactor main body shall also have a drain hole with an elbow connection.

In the conveying zone there shall not be any impeller wheel or any other mechanical breaking device. The breaking up of organic matter shall be done solely by water through an assembly of nozzles connected with solenoid valves in a special washing zone between the conveying and the compaction zone. The screening shall move towards the compaction zone by a shafted screw of a constant pitch connected to a drive shaft. This drive shaft shall be connected to the drive unit through axial and radial bearings. An electronic device shall operate the drive unit of the spiral in a forward reverse mode, separated by a stand still period. The time of forward and reverse operation as well as the stand still time shall be freely adjustable.

The non-drive end of the screw shall have the flight of reduced pitch in the compaction zone. For achieving better strength at non-drive end, the screw must be supported by wear bars connected to the wash press main body and reinforced with double flights of defined pitch.

An elephant trunk shape outlet tube shall be connected to the compactor body with a flanged connection. An elbow shall be provided at the flanged connection to carry the washed screening in the reduction tube. The reduction tube shall be divergent to ease the push of the washed screening upward into the outlet tube. The end of the reduction tube shall have an elbow with discharge plate/chute to enable the collection of the screenings in bagging units or a container.

The Screening wash compactor shall remove the organic material by washing and compaction thus reducing the volume and weight by 50%.

The main body of Screening wash compactor shall have a material thickness of minimum 3 mm and the bottom of the compactor main body shall be perforated with 5 mm holes.

The screw flights of wash compactor shall have a minimum thickness of 10 mm and at the end of compaction zone, there shall be wear bars of 10 mm thickness bolted to the wash press main body/tube for easy replacement.

The elephant trunk shaped outlet tube shall be diverging to prevent the waste getting clogged. The connection of the outlet tube to the main body shall be flanged type. All the bend fittings (elbows) in the outlet tube shall be long radius design.

Frequency Inverter shall be provided for Forward-reverse-forward motion of the screw and as overload protection device.

The gearbox of screw conveyor and wash compactor shall be hollow shaft, parallel helical gear unit have a minimum service factor of 1.2, oil bath lubricated with oil sealing. The motor shall be of TEFC type with minimum IP 55 protection & Class F insulation and be suitable for operation on 3 phase, 415V and frequency of 50 Hz. The drive shaft must be precisely machined and shall have radial and axial bearings.

The common control panel shall have IP 55 protection, painted with epoxy paint and shall be comprising of

- Mushroom head emergency stop.
- Overload relays for motor protection.
- Circuitry to operate the Screening conveyor and wash compactor with signal for start command from screen motor start and delay-timer based stop command after the screen motor stops.

- Selector switch to operate the Screening conveyor and wash compactor in Auto, manual and remote mode.
- Provision for suitable PLC circuitry shall be provided in case requirement of connectivity with SCADA system.

The Screw conveyor and wash compactor shall be supplied factory assembled and duly tested at manufacturer's works before dispatch. Upon receipt at site these shall be installed resting on the channel floor and mechanically or chemically anchored on to the platform in a way that there are minimum chances of misalignment.

Material of Construction

Screw	SS 316
Screw trough	SS 316
Screw cover	SS 316
Liner	Ultra-High Molecular Polyethylene (UHMPE)

Accessories

Anchor bolts and nuts	1 set
Special tools	1 set
Flexible joint for inlet and outlet	1 set
Liner (for spare)	1 set

Portable Screenings Container

Portable screenings containers made of galvanized steel shall be provided to store the screenings until time of pick up. Minimum two Screenings Containers shall be provided at the screening chamber.

The container shall have capacity of approximate 2.0 cum. and shall be of a convenient height to permit the discharge of screenings directly into the container without having to transfer the screenings manually. The containers shall have hinged covers and their design shall permit their being lifted by an overhead hoist or packer truck. The container will have four wheels each of minimum 40 cm diameter, Tyre type. The maximum height of container including wheels shall be 66 cms. The sides shall be constructed of 12-gauge steel. The bottom of container shall be made of 5 mm plate steel. The containers shall be reinforced with 50 mm x 50 mm x 5 mm angle.

Manual Medium Bar Screen for WWTP

(a) The screen shall be installed in inlet bypass channel to grit chamber.

(b) The aperture size of the screen shall be 10 mm and 50 angle of inclination.

(c) The screen shall be fabricated out of SS316 flats and fixing bolts shall be of stainless steel.

(d) The rectangular trash screens shall comprise SS 316, 10 mm thick and 50 mm wide in section.

(e) The screen shall be rigidly fixed to the frame.

(f) All the bypass screens shall be provided with 2 sets of SS 304 cleaning rakes with appropriate grip handle.

Manually Operated Travelling Crane

Crane

(a) The crane shall be manually operated for return activated sludge pumping station.

(b) The capacity of crane shall be as per the equipment list in particular mechanical requirement and of class II.

(c) The crane bridge shall consist of a single bridge girder carrying two wheels at each end of the span. Steel used shall be tested quality steel conforming to IS 2062.

(d) The long travel bridge wheels shall be rim toughened; heat treated galvanized carbon steel or low alloy steel or C.I. They shall be double flanged type. The wheels shall have antifriction ball/roller bearings. The wheels shall be machined on their treads to match the runway rail section. The bridge shall have a geared shaft and pulley connecting to opposite wheels of the span, to achieve the long travel motion of the bridge, by means of a chain. The runway rails of adequate strength and rigidity, rail clamps and other accessories for mounting the rails and suitable end stops for the bridge shall be supplied by the Contractor.

Trolley and Chain Pulley Block

(a) The chain pulley block shall be operated on the lower flange of the bridge girder.

(b) The load chain shall be made of alloy steel as per IS: 3109. It shall be heat treated to give ductility and toughness so that it will stretch before breaking. It shall be of welded construction with a factor of safety not less than 5.

(c) The hand chains, SS 316, for the hoisting and traverse mechanism shall hang well clear of the hook and both the chains shall be on the same side. The hand chain wheel shall be made from pressed sheet steel and shall be provided with roller type guarding to prevent snagging and fouling of the chain.

(d) All the gearing shall be totally encased. Proper lubricating arrangements shall be provided for bearings and pinions. Gears shall be cut from forged steel blanks. Pinions shall be of heat treated alloy steel. Gears shall be as per BS 436/IS: 4460.

(e) The trolley track wheels shall be rim toughened, heat treated carbon steel or alloy steel and shall be single flanged and shall have antifriction ball bearings. The wheels shall be machined on their treads to match the flanges of the track joints.

(f) The travelling trolley frame shall be made of rolled steel conforming to IS: 2062. The side plates of trolley frame shall extend beyond wheel flanges, thus providing bumper protection for the wheels. The two side plates shall be connected by means of an equalizing pin.

(g) Axles and shafts shall be made of carbon steel and shall be accurately machined and properly supported.

(h) The lifting hooks shall be forged, heat treated alloy or carbon steel of rugged construction. They shall be of single hook type

provided with a standard depress type safety latch. They shall swivel and operate on antifriction bearings with hardened races. Locks to prevent hooks from swiveling shall be provided. Hook shall be as per BS:2903/IS:3815

(i) The brake for the lifting gear shall be automatic and always in action. It shall be of screw and friction disc type self-actuating load pressure brake. Brakes shall offer no resistance during hoisting.

Electrically Operated Hoists

(a) Electric hoists shall be complete with hoisting motor, wire rope drum, wire rope, hook, necessary gearing, sheaves, electromagnetic brake for hoisting motion, weather & dust-proof push button station, contractor panel, all wiring, limit switches, etc.

(b) Electric hoists shall conform to IS: 3938 and shall be suitable for outdoor application. All the parts of the hoist shall be designed to withstand surrounding atmospheric conditions without any deterioration.

(c) Rope drums shall be either cast or welded to sustain concentrated loads resulting from rope pull. Drums shall be machine grooved right and left with grooves of a proper shape for the rope used.

(d) Gears shall be cut from solid cast or forged steel blanks or shall be of stress-relieved welded steel construction or built-up from steel billets and welded together to form a one piece gear section. Hoist ropes shall be extra flexible, improved plough steel rope with a well lubricated hemp core and having six

strands of 36 wires per strand with minimum ultimate tensile strength of 1.6 x 106 KN / Sqm.

(e) Hooks shall be solid, forged, heat treated alloy or carbon steel of rugged construction of the single hook type and provided with a standard depress type safety latch.

(f) Hoisting motor shall be equipped with electrically released, spring set, friction shoe type brakes having torque capable of holding 125% of the full rated hook load. Brake shall apply when either the motor controller or the main power switch is in 'OFF' position or in the event of power failure.

(g) Drive motors shall be designed for frequent reversal, braking and acceleration and shall be as per IS: 325. Pendant control switch, controllers and resistors, controls, electrical protective devices, cables and conductors, earthing guards etc. shall be as per IS:3938. Limit switches shall be provided for over-hoisting and over-lowering.

(h) The electric hoists shall be of Class II duty.

(i) 25% overload test, speed tests, limit switch tests and brake test shall be conducted for the hoist and trolley at manufacturer's works.

(j) Minimum Two sets. of sufficient slings, ropes, shackles, lifting beams, etc, shall be supplied to handle all items of plant covered by the crane. They shall be labelled or marked with the Safe Working Load (SWL) and the purpose for which they are intended.

Hand Operated Hoists and Trolleys

(a) Manual hoists shall be complete with hand-chain, trolley, pulley block, hook, hand and load chains, brake and other accessories. They shall comply with the latest applicable standards, regulations and safety codes in the locality where equipment will be installed.

(b) Each hoist shall be operated on a monorail (I-Beam). The factor of safety shall not be less than 5. The load chain may be heat-treated to give ductility, toughness and conforming to I.S. 3109/B.S.1663/B.S.3114. The load wheel is to be made from heavy duty malleable castings. The hand chain is to Conform with B.S. 6405 and hand chain wheel may be made from pressed sheet steel with roller type guarding. Gears shall be cut from solid cast or forged steel blanks or shall be stress – relieved welded steel construction.

(c) Pinions shall be of forged carbon or heat treated alloy steel. Strength, Quality of Steel, heat treatment, face, pitch of teeth and design shall confirm to BS-436, BS-545 and BS-721. Spur and helical gears must comply with B.S. 436 and worm with BS 721. Bearing must be ball and roller type conforming to I.S. 2513/B.S., 2525-32.

(d) Proper lubricating arrangements are to be provided for bearings and pinions. The brake for the lifting gear shall be automatic and always in action.

(e) The proof testing of each chain pulley block is to be carried out as per latest applicable standards. The safe working load is to be marked in such way that is clearly visible from the operating level.

(f) Minimum Two sets. of sufficient slings, ropes, shackles, lifting beams, etc shall be supplied to handle all items of plant covered by the crane. They shall be labelled or marked with the Safe Working Load (SWL) and the purpose for which they are intended.

Electrically Operated Overhead Travelling Crane

(a) The crane shall be electrically operated, bridge type complete with all accessories including down shop conductor, crane rails and fixtures, and shall conform to BS 2573, IS:3177 or relevant internationally approved standards.

(b) The crane bridge shall consist of bridge girders on which a wheeled trolley is to run. The bridge trucks and trolley frames shall be fabricated from structural steel. Access walkway with safe hand railing as is required along the full span length of the bridge girder. Steel shall be tested quality conforming to ASTM A36 except that, plates more than 20 mm thick shall conform to IS:2062, BS:4360 or relevant internationally approved standards.

(c) The bridge shall be designed to carry safely the loads specified in IS: 807, BS: 2573 or relevant internationally approved standards. All anti-friction bearings for bridge and trolley track wheels, gear boxes and bottom sheaves on hook shall be lubricated manually by hand operated grease pump through respective grease nipples.

(d) Wheel base and structural frame of the wheel mounting of the end carriages shall be designed so as to ensure that the crane remains square and prevent skewness. Bridge and trolley track wheels shall be of forged steel and shall be double flanged type. The wheel diameter and rail sizes shall be suitable for the wheel loads.

(e) The crane rails shall be manufactured from wear resistant austenitic manganese steel. Mountings of the wheels shall be designed to facilitate easy removal for maintenance. Walkways shall be at least 500 mm clear inside width with a 6 mm thick non-skid steel plate surface. Steel rail stops to prevent rails from creeping and trolley from running off the bridge shall be abutted against ends of rails and welded to the girders. Bridge and trolley stops to match the wheel radius shall be provided before the buffer stops.

(f) All exposed couplings, shafts, gear, wheels, pinions and chain drives etc. shall be safely encased and guarded completely to prevent any hazard to persons working around. All bearings and gears shall have a design life of 100000 hours. Electro-magnetic and hydraulic thrust or brake shall be provided for the main hoist. One electro-magnetic brake shall be provided for each of the cross travel and long travel motions.

(g) Hook shall be solid forged, heat treated alloy or carbon steel suitable for the duty service. They shall have swivels and operate on ball thrust bearings with hardened races. The lifting hooks shall comply with the requirements of IS 8610 or BS: 2903 / BS: 3017 or relevant internationally approved standards and shall have a safety latch to prevent rope coming off the hook.

(h) Hoist rope shall be extra flexible, improved plough galvanized steel rope with well lubricated hemp core and having six strands of 36 wires per stand with minimum ultimate tensile strength of 1.6×10^6 kN/m2 of Right Hand Ordinary (RHO) lay construction. The ropes shall have a 6:1 safety factor on the specified safe working load, and shall conform to IS: 2266. Rope drums shall be grooved and shall be either cast iron or cast steel of or welded steel conforming to IS:3177, BS:466 or relevant internationally approved standards.

(i) Gears shall be cut from solid cast or forged steel blanks or shall be stress relieved welded steel construction. Pinions shall be of forged carbon or heat treated alloy steel. Strength, quality of steel, heat treatment, face, pitch of teeth and design shall conform to BS:436, IS:4460 and BS: 721 or relevant internationally approved standards.

(j) Name Plate showing the capacity, year of manufacture and rated capacity of hoist in figures not less than 150 mm height shall be placed on each side of the crane girder.

(k) The maximum deflection under full load shall not exceed 1/900 of the span (as per IS: 3177).

(l) All accessory and auxiliary electrical equipment including drive motors, electrically operated brakes, controllers, resistors, conductors, insulators, current collectors, pendant push button station, protective devices, operating devices, cables, conduits, etc. necessary for the safe and satisfactory operation of the crane shall be provided. (Power to the crane shall be provided by down shop conductors manufactured from high conductivity hard drawn copper. Conductors shall be completely shrouded such that they have no exposed current carrying surfaces.

Pendant type push button station shall be sheet steel enclosed and shall comprise the following push buttons and indicating lamps:

(i) `Start' and `Stop'.

(ii) Long travel - `Right' and `Left'.

(iii) Cross travel - `To' and `Fro'.

(iv) Hook - `Hoist' and `Lower'.

(v) Red indicating lamp for supply `ON' indication.

(m) Pendant type push button shall be supported independently of the electrical cable and shall be earthed separately, independent of the suspension. Automatic reset type of limit switches shall be provided to prevent over travel for each of the following:

(i) For `UP' and `Down' motions of the hook.

(ii) Long travel motion

(iii) Cross travel motion

(n) Crane structures, motor frames and metal cases of all electrical equipment including metal conduit and cable guards shall be earthed. All motors, brakes, limit switches, panels, drum controllers, resistor unit sets shall be provided with two studs for earthing.

(o) The crane, and all slings, ropes, shackles and other lifting equipment supplied shall be tested by the manufacturer at his works. The tests shall be carried out at 125% of Safe Working Load, and Test Certificates shall be supplied.

(p) All motors shall be of the quick reversing type with electric mechanical brakes suitable for the duties specified. All movements shall be electrically powered suitable for operating with the hook loaded. Facilities shall be provided for the accurate location of the hook by means of `inching' the cross travel and down shop travel motions.

(q) Minimum Two sets. of sufficient slings, ropes, shackles, lifting beams, etc shall be supplied to handle all items of plant covered by the crane. They shall be labelled or marked with the Safe Working Load (SWL) and the purpose for which they are intended.

(r) The Contractor shall include with the cranes all necessary contactors, control cubicles and protection equipment necessary to operate the crane and provide adequate electrical protection against overload, phase and earth fault and fail-safe protection in the event of an interruption in the power supplies. All access ladders and platforms necessary to carry out maintenance and repairs shall be provided and installed by the Contractor.

(s) All electrical equipment shall be fully tropicalised.

(t) Site tests shall be carried out by the Contractor who shall supply the necessary materials for the test load. The test load shall be removed from site by the Contractor after successful tests have been carried out.

Jib cranes

Fixed Jib Cranes shall be provided for each clarifier in the lowering/removal of equipment/parts to/from the clarifier floor and transferring the same outside the clarifier area. The Jib Crane capacity shall be 1.25 times the maximum weight to be handled in the clarifier or 2.0 Tonnes whichever is maximum.

The lift and reach of the cranes shall be suitable for the clarifier offered. The crane shall be capable of being swivelled by 360°.

All materials used in the construction shall be corrosion resistant. Mild steel used shall be galvanised. Ropes, chains and pulleys shall be of stainless steel construction. Hardware shall be of SS 316.

COMPACT Pre-Treatment System (COMBI Unit)

A. Scope of Supply

Combi units are used for pre-treat wastewater before introducing the wastewater treatment plants. They perform fine screening with a Screening conveyor and compactor, and Grit removal with a Grit washing system and grease removal system. All these treatments are performed on a single equipment.

The inflow streams at first passes through a rotary drum screen (with 4 mm spacing) installed in the first chamber which removes all the floating and suspended material. The screenings are discharged directly from the screen after transport and compaction in an integrated screenings press. In the following chamber of longitudinal grit trap, settleable material is separated through the reduction of flow velocity. The plant shall be equipped with grit trap aeration for removal of Fat, Oil and Grease. A horizontal shafted screw conveyor transports the separated solids (grit and organic particles) against flow direction to a grit classifying shafted screw which is integrated at the beginning of the grit trap. During their transport in the grit classifying screw the solids are statically dewatered prior to being discharged into a container. Compact Inlet Head works includes Rotary Drum screen/Band or perforated punch holes Screening system with conveyor system and an Optimal Coarse Bubble Aerated Grit diffuser system to avoid adverse effects on downstream treatment facilities with blower arrangement with Conveyor system in a Single fabrication unit which shall be installed on the RCC Platform with necessary staircase with proper access approach.

Incoming pumping main from Terminal Sewage Pumping Station (TSPS)/Intermediate Sewage Pumping Station (ISPS) shall be connected to the inlet of Combi Unit and Outlet shall be connected to Aeration Basin/SBR Basin/MBBR Tank/IFAS Tank system.

B. Constructional Features

The complete plant shall consist of units inclusive of longitudinal grit trap, fine rotary drum screen, screw conveyors for removal, transferring and dewatering the screenings and grit in shafted design.

Longitudinal grit trap shall be equipped with the provision of removal of Fat, Oil and Grease by means of aeration by Rotary Air blowers.

Compact system shall be fabricated by using minimum 8 mm SS 316 plates with reinforcement Angles, Channels and necessary Gazette plates sufficient thickness shall be welded to have robust and compact design and construction. Lifting hook/Lugs shall be welded for lifting the entire unit from ground level to the top of the RCC Platform. Total combi unit shall be anchored with proper grouting material (GP2) shall be used to avoid the vibration on the platform. Combi unit shall be supplied with minimum one standby unit. Combi unit shall be placed on the Platform with sufficient spacing between the two units adjacent to access each unit for regular operation and maintenance. Access platform of minimum 1.5 m shall be provided all around the units with handrailing.

Complete plant shall be prefabricated structure SS316 except the drives, motors. The plant shall be designed and fabricated so as to connect with the incoming sewer pipe my means of a flange connection.

Similarly, the outlet of the plant shall be connected to the downstream treatment process via flange connection.

The rotary drum screen basket should be a precisely welded construction. The perforated plate/ wedge wire surface which retains the screenings should be welded onto a supporting structure. Spirals of metal strips on the inner drum surface transport the screenings upwards and drop them into the trough. A brush fitted to the inner drum surface cleans the trough edge as the basket rotates. The screen basket at the bottom end is to be fixed to the screw by means of a strut, while on the upper end support is to be provided with several rollers. A brush or a polyurethane sealing on the baffle plate is to be used to seal the gap between the screen basket and channel.

C. Operation and Functional Features:

The machine starts when the screen level control level (or any other start signal) is reached. The screen drive motor operates as long as the start signal is active and transports the solids out of the channel. The water level in front of the screen falls again. The screen running time must be individually adjusted to each plant by programming a (selectable) follow-up time.

If the inflow is low, screenings may accumulate in front of the screen if screen starting is not effected via screen level control. To prevent accumulation of screenings, a time can be programmed after which the screen drive motor is necessarily switched on after a selectable standstill time. The screen drive motor will then operate according to the freely programmable follow-up time.

To protect the screen against mechanical damage, the electrical control is to be equipped with an overload relay. The machine stops immediately whenever the overload relay responds. After a pause of 2 seconds the screen drive motor is reversed for a programmable time. To avoid damage of the bottom shafted screw flight screen reversal has to be limited. This applies also to manual operation, i.e., even in manual mode the screen can only be reversed for the pre-defined time even if the key or button is operated longer. A new reversal is only possible after prior forward operation.

As soon as the start signal from the level control system responds, the machine starts to run forwards again after a waiting time of 10 seconds.

If the overload relay trips 3 times within 5 minutes, the machine is stopped, and a trouble is reported. The machine can only be re-started after reset of the fault.

If the Overload relay trips during screen reversal, the machine must immediately be stopped. A fault message is reported. The machine can only be re-started after reset of the fault.

If the current relay trips during screen operation in manual mode (forwards or reversal), the machine must immediately be stopped, and a fault message reported. The machine can only be re-started after reset of the fault.

The scope of supply shall include the Combi Unit with all accessories and appurtenances, including, but not limited to:

1. **Fine screen (4 mm) with screen conveyor with Compactor**

Mesh Band or Punched hole Screen Detail specification shall be same fine Screen specification as specified in the Part 8 Cl.no. 8.10.

2. **Screen Washer system**

Screen washer system as Spray nozzle bar shall be provided for cleaning of screen basket. A solenoid valve is to be provided to control the washing operation. The solenoid valve is controlled parallel to the forward operation of the screen motor drive. While the screen basket rotates, screenings are removed by means of the flat jet nozzles. Press zone washing system is to be provided. Activation of the press zone washing system effects cleaning of the press zone and press liquor collection chamber. For this purpose the solenoid valve for press zone washing is to be provided. The integrated screenings washing system shall be provided to wash out the faces contained within the screenings and return them to the biological process. Such screenings washing improves screenings dewatering efficiency.

Washing system consist of three washing stages: preliminary washing, washing with pressure, fine washing, Preliminary washing / washing with pressure is carried out by water supply via the solenoid valve. Fine washing: Three washing units on the rising pipe are connected with pressure hoses, The nozzles spray in an exactly defined angle onto the screenings while these are conveyed by the screw. Water supply is via a second solenoid valve on machine and bigger which is controlled separately (solenoid valve for fine washing). Tank cleaning system is to be provided for cleaning of the tank with solenoid valve.

3. **Grit removal system with Grit washing system and Grease removal system**

The Retention time for Grit and grease removal should be 2.5 minutes and above. For aerated plants a grease trap shall be provided. Floating particles are carried over to the attached grease trap more or less with the air roll of grit trap aeration. The grease is to be removed intermittently by an integrated grease paddle.

Wastewater flows into the grit removal zone, where the finer solids materials are still present in the wastewater are settled in the tank with the introduction of air, and the same has been conveyed to the hopper by a horizontal screw conveyor which is installed for grit removal conveys the grit particles in to a Grit washing system.

The Grit washing system is used to separate the grit and clean grit (sand, gravel) from wastewater, removing organic matter and preparing it for further processing or disposal. The cleaned grit is then discharged via a screw conveyor to a discharge bin or container, while the washed-out organics are typically returned to the wastewater flow.

The grease paddle ensures uniform removal of grease over the entire grease trap surface. The grease paddle pushes the grease into a collection chamber at the beginning of the plant from where it is pumped by an eccentric screw pump. For aerated grit traps, Rotary Lobe blower is to be provided for aeration. The individual air tubes can be adjusted to specific site requirements via separate ball valves.

System has a blower integrated and coarse bubble diffusers and a scum cleaning and removal device that contains air to prevent the rotary cleaner from clogging, grease are generated and forced to corner where a water nozzle system are moving and pushing grease to a rotary scraper which will concentrate and eliminate grease discharging it by gravity pipe into container. A Grease removal unit is integrated into the system to remove the oil and grease in the incoming sewage water. System have a blower integrated and coarse bubble diffusers, grease are generated and forced to corner where a water nozzle system are moving and pushing grease to a rotary scraper which will concentrate and eliminate grease discharging it by gravity pipe into container.

4. Discharge Chute

A Discharge chute stainless steel 316 shall be provided at the discharge part of the screw conveyor. The chute shall be constructed such that the screenings are blocked from being discharged.

5. Screw Conveyor with compactor

Technical specifications of Screening Conveyor

The Screening Conveyor shall be Shaft Screw Conveyor and applied for conveying the floating debris to the next facilities. The screening system shall be supplied with a shaft screw conveyor that will be used to convey the screenings to the automatic screenings press and discharge system that compacts, dewaters and discharges the screenings through a chute to the screenings storage system.

Dumping of the screenings on to the duty/standby conveyor opening shall be with the automatic deflection plate, which shall be positioned towards the conveyor which is selected from the LCP/SCADA for the duty and automatically towards the standby if duty conveyor trips. Position of this deflection plate shall be interfaced with PLC.

Screening wash compactor shall be suitable for washing and compacting the floating waste coming out of the duty and standby shaft screw conveyor in case of multiple screens, or directly from the screen in case of single screen installed in municipal wastewater pumping station or treatment plant.

Shaft screw conveyor shall be made of stainless steel of grade SS 316 and shall incorporate shaft spirals. Cover plates for shaft screw conveyors shall be provided along the entire conveyor length to contain splatter. Conveyor trough covers shall be made from 5 mm of specified grade of stainless-steel single piece formed sheet metal, not greater than 1000 mm in length, attached to the screw conveyor trough using toggle clamps. The cover shall also be of sufficiently tight fit to prevent the conveyed media from leaking out of the conveyors. A minimum 2.5 mm neoprene gasket of 50 durometer shall be applied with an appropriate adhesive to the mating surfaces of the trough covers.

Its structure shall have excellent durability to continuous running for long time. It shall be well considered of abrasion resistance, corrosion and vibration resistance. It should have a structure which is free from debris material clogging.

The spiral flighting for the shaft screw conveyors shall be designed to convey material without a center shaft. The spiral flights shall be designed with stability to prevent distortion and jumping in the trough while operating at design speed and design capacity. The spiral flighting shall be Stainless steel of grade SS 316.

Shaft conveyor trough liner material shall be an ultra-high molecular (UHMW) polyethylene with a minimum 12 mm thickness. There shall be two colored layers in the liner material to indicate wear. The liner shall extend the full length of the trough, covering the entire semicircular bottom portion of the trough. The liner shall be secured at intervals not to exceed 1000 mm, using specified stainless steel retaining clips of an approved design.

Screening wash compactor shall be made of stainless steel of grade SS 316. The wash compactor will receive the waste through inlet hopper and the waste shall get dropped into the conveying zone of the compactor main body.

Screw and liner shall have rigid thickness for resisting corrosion and abrasion caused during carrying of debris. Its structure shall be designed not to invite biting and clogging. Casing shall be equipped with inspection port to the necessity as well as for cleaning convenience. Driving device shall have overload limiting switch for avoiding broken situation caused by overloading.

The conveying zone shall have perforations at the bottom so that the water coming along with the wet screening is dropped into the dewatering trough. The dewatering trough will have a set of nozzles

positioned upwards so that the screening particles chocking the perforations will be removed by the force of spray water. The construction of the dewatering trough shall be inclined towards the drive end so as to enable the flow of water to the drain hole provided with an elbow connection. The compactor main body shall also have a drain hole with an elbow connection.

In the conveying zone there shall not be any impeller wheel or any other mechanical breaking device. The breaking up of organic matter shall be done solely by water through an assembly of nozzles connected with solenoid valves in a special washing zone between the conveying and the compaction zone. The screening shall move towards the compaction zone by a shafted screw of a constant pitch connected to a drive shaft. This drive shaft shall be connected to the drive unit through axial and radial bearings.

An electronic device shall operate the drive unit of the spiral in a forward reverse mode, separated by a stand still period. The time of forward and reverse operation as well as the stand still time shall be freely adjustable.

The non-drive end of the screw shall have the flight of reduced pitch in the compaction zone. For achieving better strength at non-drive end, the screw must be supported by wear bars connected to the wash press main body and reinforced with double flights of defined pitch.

An elephant trunk shape outlet tube shall be connected to the compactor body with a flanged connection. An elbow shall be provided at the flanged connection to carry the washed screening in the reduction tube. The reduction tube shall be divergent to ease the push of the washed screening upward in to the outlet tube. The end of the reduction tube shall have an elbow with discharge plate/chute to enable the collection of the screenings in bagging units or a container.

The Screening wash compactor shall remove the organic material by washing and compaction thus reducing the volume and weight by 50%.

The main body of Screening wash compactor shall have a material thickness of minimum 3 mm and the bottom of the compactor main body shall be perforated with 5 mm holes.

The screw flights of wash compactor shall have a minimum thickness of 12 mm and at the end of compaction zone, there shall be wear bars of 10 mm thickness bolted to the wash press main body/tube for easy replacement.

The elephant trunk shaped outlet tube shall be diverging to prevent the waste getting clogged. The connection of the outlet tube to the main body shall be flanged type. All the bend fittings (elbows) in the outlet tube shall be long radius design.

Frequency Inverter shall be provided for Forward-reverse-forward motion of the screw and as overload protection device.

The gearbox of screw conveyor and wash compactor shall be hollow shaft, parallel helical gear unit have a minimum service factor of 1.2, oil bath lubricated with oil sealing. The motor shall be of TEFC type with minimum IP 55 protection & Class F insulation and be suitable for operation on 3 phase, 415V and frequency of 50 Hz. The drive shaft must be precisely machined and shall have radial and axial bearings.

The common control panel shall have IP 55 protection, painted with epoxy paint and shall be comprising of

- Mushroom head emergency stop.
- Overload relays for motor protection.

- Circuitry to operate the Screening conveyor and wash compactor with signal for start command from screen motor start and delay-timer based stop command after the screen motor stops.
- Selector switch to operate the Screening conveyor and wash compactor in Auto, manual and remote mode.
- Provision for suitable PLC circuitry shall be provided in case requirement of connectivity with SCADA system.

The Screw conveyor and wash compactor shall be supplied factory assembled and duly tested at manufacturer's works before dispatch. Upon receipt at site these shall be installed resting on the channel floor and mechanically or chemically anchored on to the platform in a way that there are minimum chances of misalignment.

Accessories

Anchor bolts and nuts	1 set
Special tools	1 set
Flexible joint for inlet and outlet	1 set
Liner (for spare)	1 set

6. Portable Screenings Container

Portable screenings containers made of galvanized steel shall be provided to store the screenings until time of pick up. Minimum two Screenings Containers shall be provided at the screening chamber. The container shall have capacity of approximate 2.0 cum and shall be of a convenient height to permit the discharge of screenings directly into the container without having to transfer the screenings manually. The containers shall have hinged covers and their design shall permit their being lifted by an overhead hoist or packer truck. The container will have four wheels each of minimum 40 cm diameter, Tyre type.

The maximum height of container including wheels shall be 66 cms. The sides shall be constructed of 12-gauge steel. The bottom of container shall be made of 5 mm plate steel. The containers shall be reinforced with 50 mm x 50 mm x 5 mm angle.

The system will have an Odour enclosure to treat as a meeting Odour intensity to a level that minimizes adverse effects on the living environment at Near the exhaust duct outlet of the deodorizing device with the pipe in the screen zone, grit/grease tank, and sand washer.

a) Material of Construction

The material of construction of the Combi Unit shall be grade 316L stainless steel and an Odour control system, a Carbon filter shall be FRP Vessel.

b) Corrosion Resistance

All metal parts of the screen equipment that are in contact with the sewage shall be constructed of a suitable grade of corrosion-resistant stainless steel 316 L, and odour gases of FRP vessel and ducting.

c) Performance criterion

90 % of grit removal for particle size ≥ 0,2 mm, Specific gravity of grit particle shall be 2.65

d) Motor Specifications

Premium efficiency class (IE3 and above), with IP55 Protection, Nominal voltage 415V±10% and nominal frequency 50 Hz, Design ambience temperature shall be 45 Degree Celsius.

e) Working Stress and Design

The design of all parts shall ensure that under the most onerous of conditions, they will not be damaged or corroded. Any joint that will need to be dismantled during maintenance shall be made with anti-corrosion type fasteners. All spare parts shall be fully interchangeable with the original part. If the spare part is unavailable due to cessation of production, the Contractor shall give notice to the Employer in writing, detailing the options available to the Contractor.

All parts shall be designed to minimize the risk of fire and consequential damage. All parts shall be designed to prevent the ingress of vermin, dust, and dirt. All electrically live or moving parts shall be adequately guarded to prevent accidental contact.

f) Outlet Guarantee Parameters of Combi Unit

Sl. No.	**Parameters**	**Value**
a)	Dry solids content in debris	Up to 30%
b)	Waste volume reduction	Up to 50%
c)	Waste weight reduction	Up to 60%
d)	Grit removal efficiency for particles > 0.200mm (200 Microns) > 0.100mm (100 Microns)	 90% 85%
e)	Final dewatered grit from the Grit washer	< 3% on dry basis
f)	H2S Outlet of OCU	< 0.5 ppm

g) Material of construction:

Sl. No.	Item Description	Particulars
A	**Compactor Tank**	
i.	Material Of Construction with Partitions inside the Tank	Minimum 8 mm SS 316 plates with reinforcement Angles, Channels, and necessary Gazette plates
ii.	Tank Structure with Partitions	Rectangular with Hopper Bottom
iii.	Inlet and Outlet connection	SS 316, Flanged type (PN 10 Rating)
iv.	Opening size	Pipe Diameter equal to incoming Pumping main size
v.	Top Cover for Odour Control unit	SS 316 Plate with minimum 5 mm thick, Odour control unit Flange connection on the top cover
vi.	Overflow Pipe	Overflow Pipe provision with DI piping upto nearest drain Point
B	**Screen and Compactor**	
i.	Fine Screen Type	Automatic Rotary Drum Screen or Punched Hole/mesh Fine Screen
ii.	Screen Opening size	4 mm (Maximum)
iii.	Screen Mesh or Plate thickness	Minimum 4 mm
iv.	Top, Bottom & Side Plates	Minimum 5 mm thick

Sl. No.	Item Description	Particulars
v.	Discharge chute	Minimum 4 mm thick
vi.	Screw Conveyor type	Shafted or Shaftless both are accepted
vii.	Drum/Screen Cleaning	By Brush fitted on Spiral or Water Spray jet type by Plant Water or Motorised Brush cleaning for Fine Band/Mesh Screen
viii.	Rotation Speed	6 RPM (Maximum)
ix.	Geared Motor Voltage/Frequency/Degree of Protection/ Insulation type	415V/ 50Hz/ IP55/ Class F
x.	**Material of construction for Rotary Drum Screen**	
a.	Screw Conveyor with wash compactor	SS 316
b.	Drum / Punched/ Mesh Plate	SS 316
c.	Channel Sealing and Drive Shaft	SS 316
d.	Water Nozzle	SS 316
e.	Brush	Nylon
xi.	**Material of construction for Mesh Band/Punched Hole Fine Screen**	
a.	Screen Filter step/Mesh or	Stainless Steel ASTM A 240,

Sl. No.	Item Description	Particulars
	Plate	Grade 316L
b.	Screen Frame (Top, Bottom, Adjacent Sides and Dead Plates)	Stainless Steel ASTM A 240, Grade 316
c.	Drive Chain & Sprocket	Stainless Steel ASTM A 240, Grade 316L/ Duplex Stainless Steel SAF 2205
d.	Drive Shaft	Stainless Steel ASTM A 276, Grade 316
e.	All Fasteners and Anchor Bolts	Stainless Steel, Grade 316
f.	Discharge chute	Stainless Steel ASTM A 240, Grade 316
g.	Spray bars & jet nozzles	Stainless Steel ASTM A 240, Grade 316L
xii.	**Screw Conveyor and Compactor**	
a.	Screw	SS 316
b.	Screw trough	SS 316
c.	Screw cover	SS 316
d.	Liner	Ultra-High Molecular Polyethylene (UHMPE)
C	**Areated Grit System and Grease Removal unit**	
i.	Blower Type	Rotary Lobe Blower
ii.	Installation Location	At Ground Level Near to the Inlet Head Works with proper RCC Building

Sl. No.	Item Description	Particulars
iii.	Capacity and Pressure	As per vendor Recommendation
iv.	Areated Grit Piping	Coarse Bubble type with 5 mm Pore size (maximum)
v.	Material of Construction of piping	SS 316 L with minimum Schedule 40S Seamless
vi.	Pipe Supports for Air Piping	SS 316 L
vii.	Grit Conveyor and Screw Classifier	Shafted or Shaftless both are accepted
viii.	Material of Construction of Grit Conveyor and Screw Classifier	
a.	Screw	SS 316
b.	Screw trough	SS 316
c.	Screw cover	SS 316
d.	Liner	Ultra-High Molecular Polyethylene (UHMPE)
ix.	Geared Motor Voltage/Frequency/Degree of Protection/ Insulation type	 415V/ 50Hz/ IP55/ Class F
x.	Settling Tank at end of unit	Partition within the compactor unit with Effluent Outlet SS 316, Flanged type (PN 10 Rating)

Approved Vendor/Manufacturer/Make List-Mechanical Equipment

The naming of a manufacturer in this specification is not intended to eliminate competition or prohibit qualified manufacturers from offering equipment. Rather, the intent is to establish a standard of excellence for the material used, and to indicate a principle of operation desired.

	CONSOLIDATED Mechanical Equipment VENDOR LIST	
S.NO.	**ITEM DESCRIPTION**	**APPROVED VENDOR/ MANUFACTURER / MAKE**
1	Air Compressor	M/s Ingersoll Rand
		M/s Kaeser
		M/s Kirloskar Pneumatics
		M/s Atlas Copco
		M/S-Chicago Pneumatics
		M/S - Elgi Compressor
2	Air Blowers (Roots Type)	M/s Swam Pneumatics
		M/s Everest
		M/s TMVT Industries

	CONSOLIDATED Mechanical Equipment VENDOR LIST	
S.NO.	**ITEM DESCRIPTION**	**APPROVED VENDOR/ MANUFACTURER / MAKE**
		M/s ACME Air Equipments
		M/s Usha compressors
34	Cranes (EOT, Hoists, Jib cranes)	M/s Brady & Morris
		M/s Eddy Cranes
		M/s Safex Electromech
		M/S - Hercules Hoists Ltd.
		M/S - Avon Cranes
		M/S - Reva
		M/S - Wester
46	Exhaust Fans	M/s Alstom
		M/s Howden
		M/s Bajaj
		M/s Marathon
		M/s Crompton

	CONSOLIDATED Mechanical Equipment VENDOR LIST	
S.NO.	**ITEM DESCRIPTION**	**APPROVED VENDOR/ MANUFACTURER / MAKE**
		M/s Almonard
58	Horizontal/Vertical Centrifugal Pumps	M/s KBL
		M/s Wilo /Mather & Platt
		M/s KSB
		M/s Grundfos
		M/s WPIL
		M/s Pentair
		M/s Sam Turbo machinery
		M/s Xylem
		M/s Andritz
	Submersible Pumps	M/s KSB
		M/s Xylem
		M/s Wilo
		M/s WPIL
		M/s ABS Sulzer
		M/s Grundfos
		M/s Kishor

	CONSOLIDATED Mechanical Equipment VENDOR LIST	
S.NO.	**ITEM DESCRIPTION**	**APPROVED VENDOR/ MANUFACTURER / MAKE**
	Submersible Pumps-Tube installed	M/s ABS Sulzer
		M/s Xylem
		M/s WPIL
		M/s Wilo
		M/s Grundfos
		M/s KSB
69	Chemical Dosing Pumps	M/s Milton Roy
		M/s Prominent
		M/s Heidelberg
		M/s Positive Metering Pumps
		M/s Swelore Engineering
		M/s SR Metering Pumps
713	Butterfly Valve	M/s Pentair
		M/s Fouress
		M/s VAG Valves
		M/s Hawle

	CONSOLIDATED Mechanical Equipment VENDOR LIST	
S.NO.	**ITEM DESCRIPTION**	**APPROVED VENDOR/ MANUFACTURER / MAKE**
		M/s Indian Valve Company
		M/s AVK Valves
		M/s KBL
814	Sluice Valve for Sewage Application	M/s VAG
		M/s KBL
		M/s AVK Valves
		M/s Jupiter Valves
		M/s Indian Valve Company
915	Non-Return Valve for Sewage Application	M/s VAG
		M/s KBL
		M/s AVK Valves
		M/s Jupiter Valves
		M/s Indian Valve Company
105	PP Valve	M/s Shenco
		M/s U N Poly valves

	CONSOLIDATED Mechanical Equipment VENDOR LIST	
S.NO.	**ITEM DESCRIPTION**	**APPROVED VENDOR/ MANUFACTURER / MAKE**
		M/s George Fischer
		M/s Beaver Process Equipment
116	Penstock Gates	M/s Jash
		M/s Durga Valves
		M/s Yashwant
127	M.S- Plates	M/s Jindal
		M/s TATA
		M/s Sail
138	Stainless Steel Pipes	M/s SAIL
		M/s Jindal
		M/s. Remi Pipes
		M/s Roopam Steel
		M/s Ratnamani
149	GI Pipes	M/s TATA Pipes
		M/s Jindal Pipes
		M/s Surya Pipes
1520	DI Pipe & DI Pipe Fittings	M/s Kiswok (For Fittings Only)

	CONSOLIDATED Mechanical Equipment VENDOR LIST	
S.NO.	**ITEM DESCRIPTION**	**APPROVED VENDOR/ MANUFACTURER / MAKE**
		M/s Kejriwal Castings
		M/s Jindal Saw
		M/s Electrotherm
		M/s Jupiter (For Fittings Only)
		M/s Electro steel Castings
16~~23~~	Centrifugal Air Blowers	M/s ABS Sulzer
		M/s Siemens
		M/s Turbomax
		M/s Neuros (Usha Neuros)
		M/s Aerzen
17~~24~~	Coarse, Medium Bar Screen type/Trash Rake Bar Screen	M/s Jash Engineering
		M/s Jhonson (Aqseptence) screens
		M/s Huber
18~~25~~	Electric Actuators	M/s Auma

	CONSOLIDATED Mechanical Equipment VENDOR LIST	
S.NO.	**ITEM DESCRIPTION**	**APPROVED VENDOR/ MANUFACTURER / MAKE**
		M/s Limitork
		M/s Rotork
1926	Fine Screen (Mesh/ Punched hole type)	M/s Estragua
		M/s Huber
		M/s OVIVO
		M/s Jash Engineering
2027	Solid Grabbing Unit	M/s Estragua
		M/s OVIVO
		M/s Jash Engineering
		M/s Jhonson (Aqseptence) screens
219	Ultrafiltration System	M/s Koch Membrane
		M/s Toray
		M/s Veolia Water
		M/s Dupont

	CONSOLIDATED Mechanical Equipment VENDOR LIST	
S.NO.	**ITEM DESCRIPTION**	**APPROVED VENDOR/ MANUFACTURER / MAKE**
2230	Pre-Treatment Combi Unit	M/s Jhonson (Aqseptence) screens
		M/s Estragua
		M/s Huber
2332	Pneumatic Actuators	M/s Rotex
		M/s D Torque
		M/s Elomatic
2433	Double Wall Corrugated (DWC) HDPE Pipes	M/s Jain Irrigation
		M/s Alom Extrusions
		M/s Prince
		M/s Supreme
		M/s Jagannath Industries
2534	Motors	M/s Crompton Greaves Ltd
		M/s Marathon Electric (Alstom)
		M/s GEC
		M/s Siemens

	CONSOLIDATED Mechanical Equipment VENDOR LIST	
S.NO.	**ITEM DESCRIPTION**	**APPROVED VENDOR/ MANUFACTURER / MAKE**
		M/s Kirloskar Electric company
		M/s Bharat Bijlee Ltd
		M/s ABB
		M/s-TOSHIBA
2635	Ball Valves	M/s BDK Engineers
		M/s Flowchem
		M/s Virgo
		M/s Hawa Valves
		M/s KBL
		M/s GM Valves
		M/s Micro finish
2736	Knife Gate valves	M/s Jash Engineering (Scheutte)
		M/s Bray
		M/s Fouress
		M/s KBL

	CONSOLIDATED Mechanical Equipment VENDOR LIST	
S.NO.	**ITEM DESCRIPTION**	**APPROVED VENDOR/ MANUFACTURER / MAKE**
		M/s VAG
		M/s AVK
2837	Air Valves	M/s KBL
		M/s ARI Valves
		M/s Jupiter Valves
		M/s Indian Valve Company
		M/s VAG Valves
		M/s AVK Valves
2938	Diaphragm valves	Crane Process
		Micro finish
		BDK Engineers
		Leader
3039	Eccentric Plug valves	M/s Dezurik
		M/s Emerson
		M/s Viking Jhonson
3141	Air conditioner	M/s Bluestar
		M/s Samsung

	CONSOLIDATED Mechanical Equipment VENDOR LIST	
S.NO.	**ITEM DESCRIPTION**	**APPROVED VENDOR/ MANUFACTURER / MAKE**
		M/s Voltas
		M/s Mitsubishi
3242	Vacuum Pump	M/s - Kirloskar Brothers Ltd.
		M/s - Slm Manek Lal Industries Ltd.
3343	Metering Pumps	M/s Swelore
		M/s Milton Roy
		M/s Prominent
		M/s Positive Metering Pumps
		M/s SR Metering Pumps
		M/s Dover India Ltd
		M/s JEW
		M/s Matz
3444	Weigh Bridge	M/s - Vishwa Karma
		M/s - Avery India Ltd.
3545	Fire Extinguishers	M/s - Steelage

	CONSOLIDATED Mechanical Equipment VENDOR LIST	
S.NO.	**ITEM DESCRIPTION**	**APPROVED VENDOR/ MANUFACTURER / MAKE**
		Industries
		M/s - Vijay Fire Protection System Pvt. Ltd.
		M/s –Safex Fire Services Ltd.
3646	Caustic Pump	M/s - Rajedia,
		M/s - Antico,
		M/S – Investa
3747	FRP Centrifugal Air Blower	M/S - Supreme Plastic,
		M/S - Nufibrotech,
		M/S - BSF
		M/S - Patel Air Flow
3848	UPVC & HDPE Pipes	M/s Jain Irrigation
		M/s Finolex
		M/s Duraline
		M/s Manikya Palstichem
		M/s Pennwalt Agro
		M/s - Astral
		M/s - Ashirwad

	CONSOLIDATED Mechanical Equipment VENDOR LIST	
S.NO.	**ITEM DESCRIPTION**	**APPROVED VENDOR/ MANUFACTURER / MAKE**
		M/s - Prince
		M/s - Supreme
3949	Basket Type Strainer/Self Cleaning online Filters for UF system	Amiad filter
		STF Filters
		Filter Concept

All the equipment, to be supplied under this contract has to be from experienced manufacturer. The equipment of only those manufacturers, who have sufficient proven experience of manufacturing the respective equipment of similar capacity, shall be considered.

SECTION 8:

DRAWINGS

(Annexed in Karnataka-Public Procurement Portal separately)

SECTION 9:

BILL OF QUANTITIES

(Filled vide Karnataka Public Procurement portal under financial document through work template)

Note:

(1) Item for which no rate or price has been entered in will not be paid for by the Employer when executed and shall be deemed covered by the other rates and prices in the Bill of Quantities (refer: ITB Clause 11.2 and CC Clause 37.2).

(2) Unit rates and prices shall be quoted by the Tenderer in Indian Rupees.

(3) Where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by quantity, the unit rate quoted shall govern [ITT Clause 24.1 (b)]

SECTION 10:

FORMAT OF BANK GUARANTEE FOR SECURITY DEPOSIT

To: _____ [name of Employer]
_____ [address of Employer]

WHEREAS _____ [name and address of Contractor] (hereinafter called "the Contractor") has undertaken, in pursuance of Contract No. _____ dated _____ to execute _____ [name of Contract and brief description of Works] (hereinafter called "the Contract");

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with his obligations in accordance with the Contract;

AND WHEREAS we have agreed to give the Contractor such a Bank Guarantee;

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor, up to a total of Rs._____ [amount of guarantee] [63]_Rupees_____ _____[in words], and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of _____ [amount of guarantee][64] as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Contractor before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the Contract or of the Works to be performed there under or of any of the Contract documents which may be made between you and the Contractor shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

This guarantee shall be valid until 30 days from the date of expiry of the Defects Liability Period.

Signature and seal of the guarantor _____
Name of Bank _____
Address _____
Date _____

[63] An amount shall be inserted by the Guarantor, representing the percentage of the Contract Price specified in the Contract.